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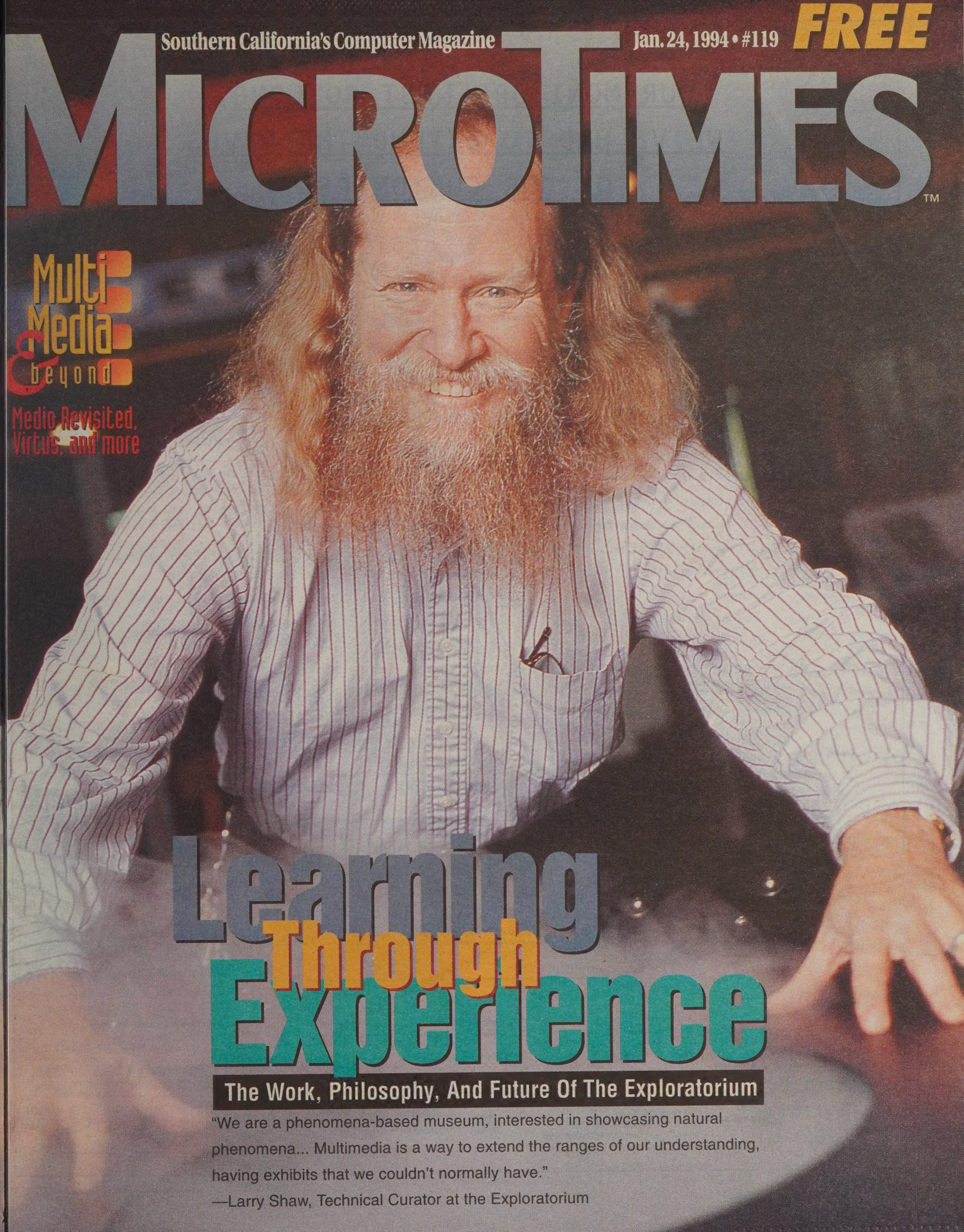

Multi Media & beyond

Medio Revisited, Virtus, and more

Learning Through Experience

The Work, Philosophy, And Future Of The Exploratorium

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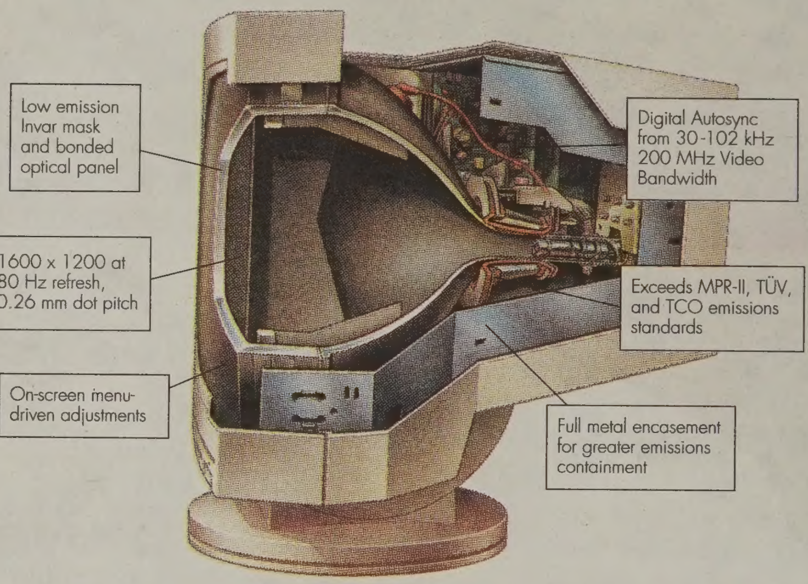
Low emission Invar mask and bonded optical panel
1600 x 1200 at 80 Hz refresh, 0.26 mm dot pitch
On-screen menu-driven adjustments
Digital Autosync from 30-102 kHz 200 MHz Video Bandwidth
Exceeds MPR-II, TÜV, and TCO emissions standards
Full metal encasement for greater emissions containment

True, nobody's drawn a direct connection between video display emissions and longevity. But people are worried enough to have government-set limits on them. The strictest limits come from Scandanavia.

So do the monitors that cut these emissions so low they can't even be measured: Nokia. Nokia monitors with MicroEmission® far surpass even TCO*—the toughest emissions standards in the world—with bonded display panels and full metal encasement.

Fine. But what does that leave you to look at?

NOKIA MICROEMISSION GREATLY REDUCES MAGNETIC AND ELECTRICAL FIELDS EXPOSURE BELOW THE CURRENT MPR-II AND TCO STANDARDS.

Well, Nokia MultiGraph® series monitors are arguably the most vivid in the world. In fact, the vast 21" unit achieves a 1600 x 1200 display at a remarkable 80 Hz refresh rate with 0.26 mm dot pitch. In other words: Huge, clear and absolutely flicker-free. The unique FullScreen® feature eliminates the dead border without edge distortion. The picture can be adjusted not just horizontally and vertically, but also trapezoidally and orthogonally. More impressively, the DigiControl™ on-screen menu-driven display adjustment can memorize your workstyle preferences (which is faster, easier, and far more precise than reaching for knobs hidden in the back somewhere.)

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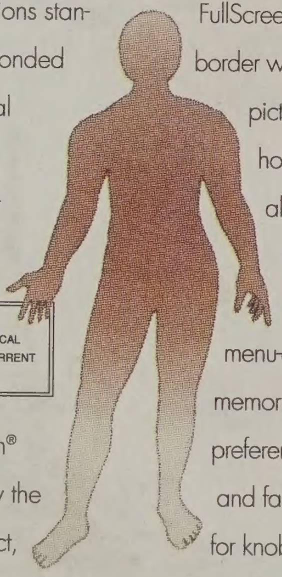

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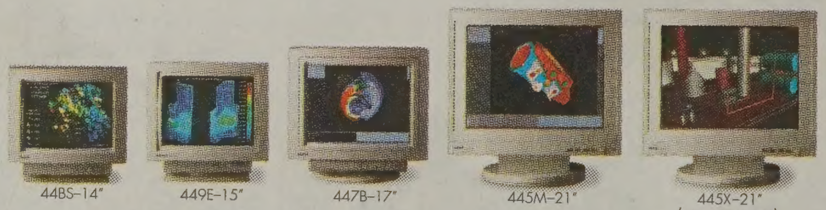
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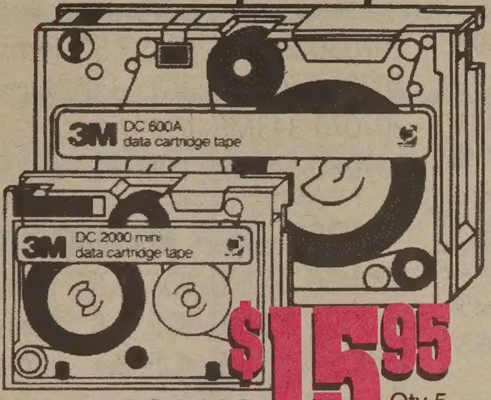
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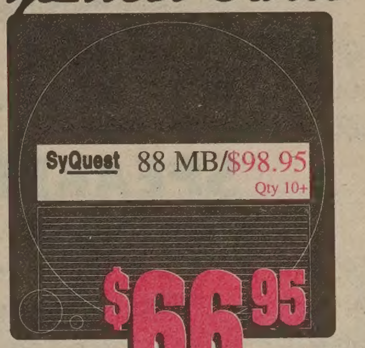

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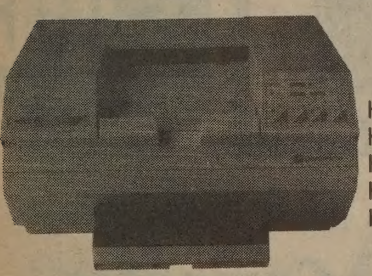

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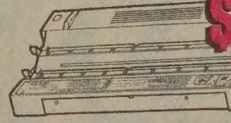

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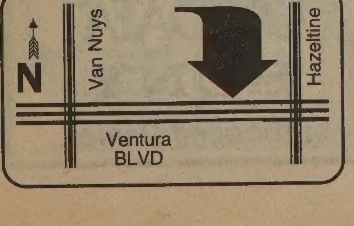

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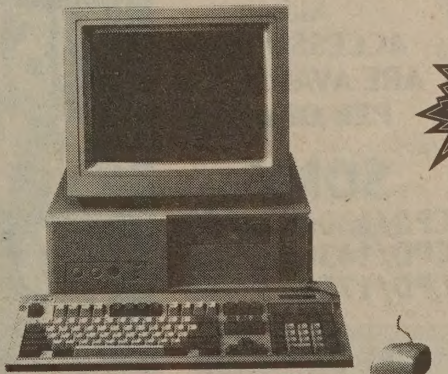

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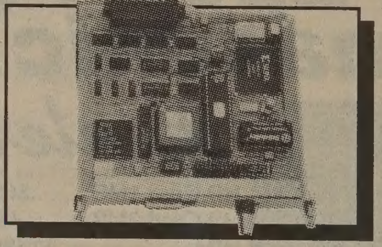

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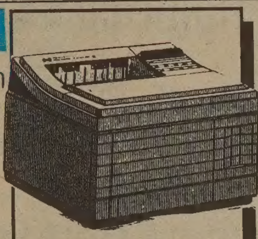

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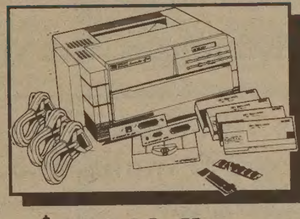

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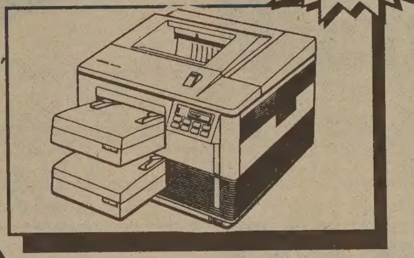

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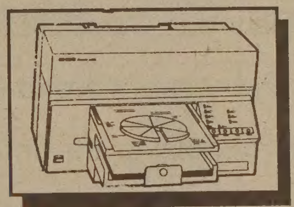

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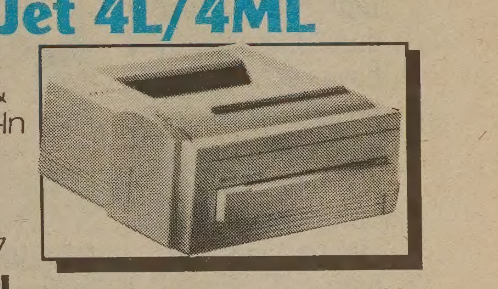

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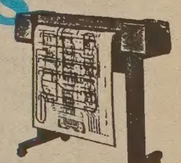

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Both "multimedia" and "Internet" have become household words in the last year, and this issue brings a variety of perspectives on both.

In our cover story, we look at how the Exploratorium, a pioneer in interactive science museum exhibits in the analog world, is moving into the digital age.

We're also proud to feature a chapter from a new book by our own UNIX columnist Bennett Falk, called *The Internet Roadmap*. Bennett offers tips on accessing a world of information with gopher.

And, of course, in our MultiMedia & Beyond section, our writers bring you information about the latest products and technologies.

—ME

Micro Marketplace

A Special Advertising Section For
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COVER STORY

Learning Through Experience

BY MICHAEL ROBIN 66
COVER PHOTO: SUSANA MILLMAN

In this interview, Technical Curator Larry Shaw explains how San Francisco's world-renowned science museum is turning to the Internet and multimedia to make its exhibits more accessible.

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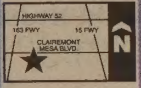

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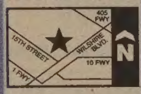

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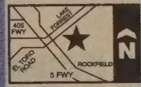

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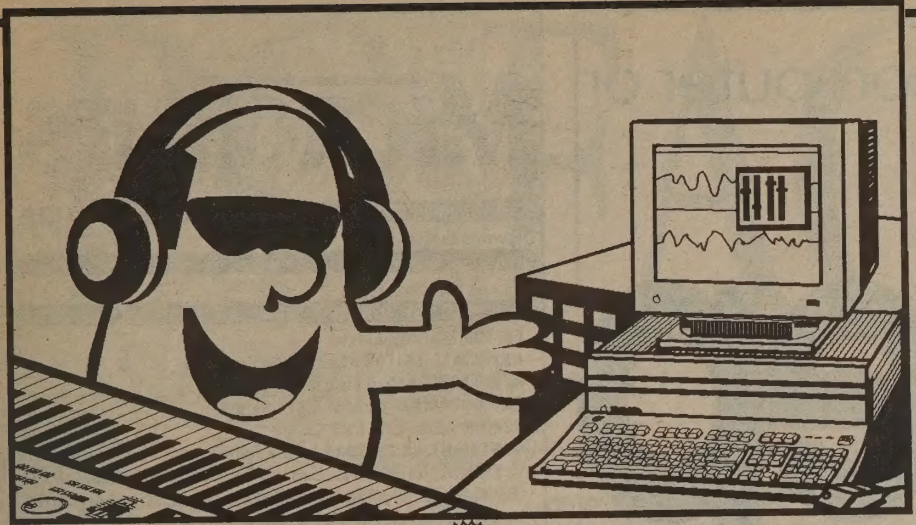

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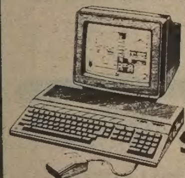

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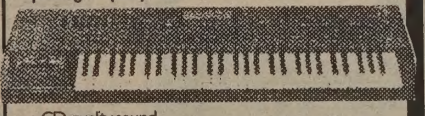

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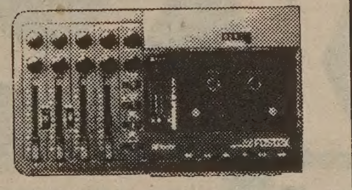

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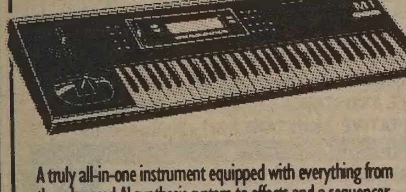

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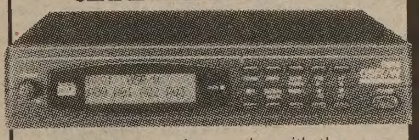

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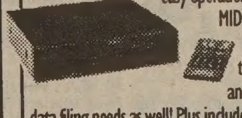

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- Desk Top Case with 6 Bayes

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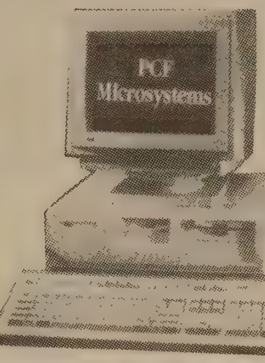

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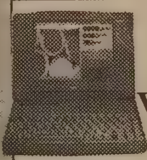

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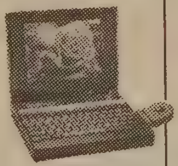

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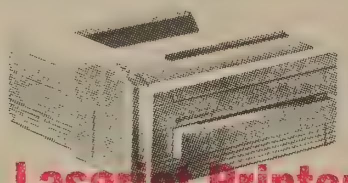

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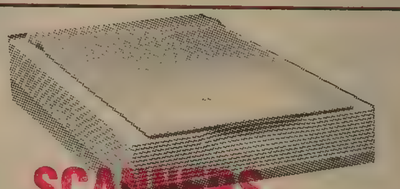

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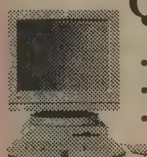

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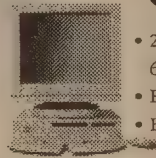

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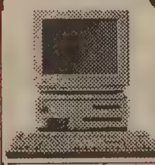

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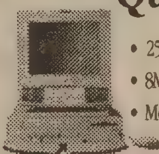

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- Monitor & K.B. Not Included

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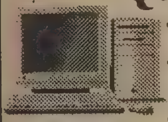

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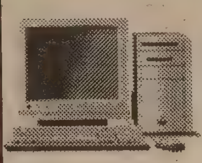

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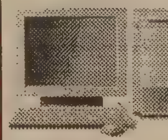

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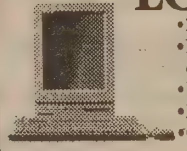

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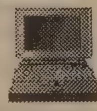

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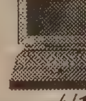

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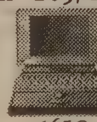

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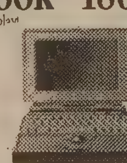

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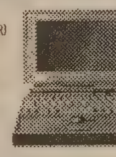

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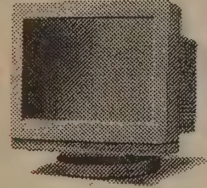

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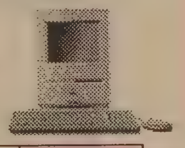

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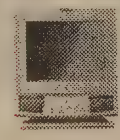

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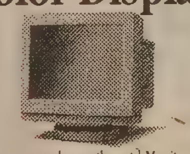

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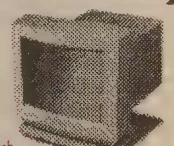

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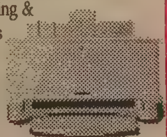

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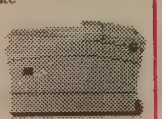

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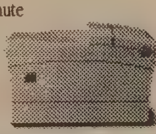

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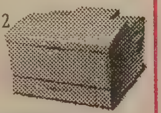

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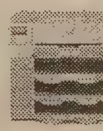

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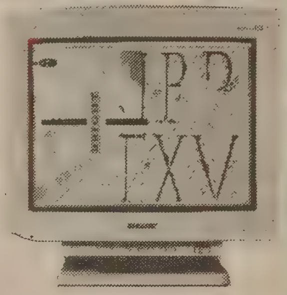

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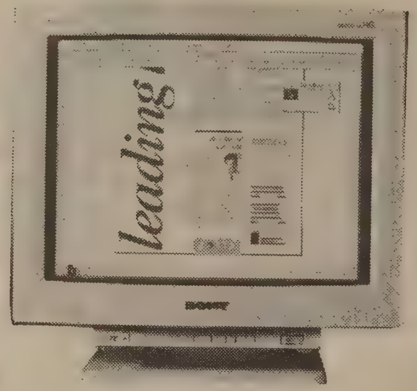

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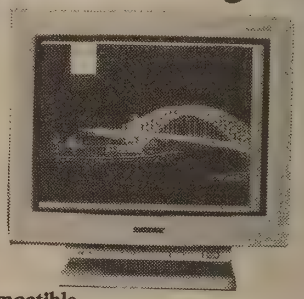

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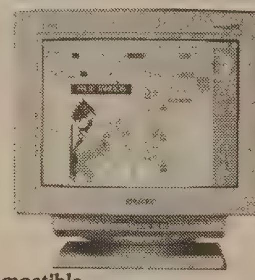

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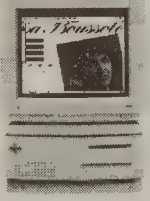

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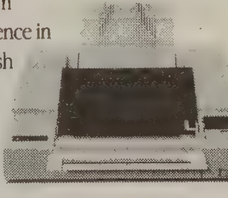

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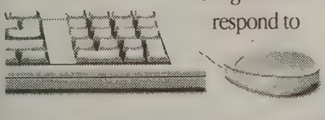

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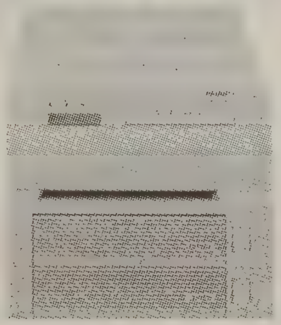

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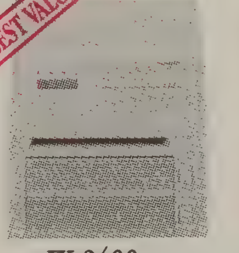

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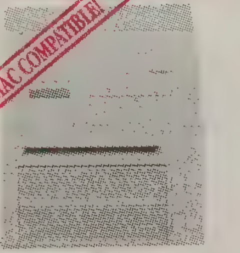

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INDUSTRY INSIGHT

Patent Office Reviews Compton Multimedia Patent; Microsoft Shows New Windows; Apple Announces eWorld

BY PAUL HOFFMAN

Copyright © 1994 by Paul Hoffman. All rights reserved. Paul Hoffman is an industry analyst who has been covering microcomputer technology for ten years. He can be reached on Internet (phoffman @well) or CompuServe (71545,346). He also writes popular microcomputer books.

The US Patent and Trademark Office has decided to reexamine Compton's New Media's controversial patent, even before any formal challenge was filed.

MANY SOFTWARE DEVELOPERS THINK THAT THE MARKET FOR NT SOFTWARE WILL BE MINUSCULE IN COMPARISON TO THE PRESS IT RECEIVED, POSSIBLY SMALLER THAN THE UNIX-ON-PCS MARKET. BUT THE NEXT BIG THING FOR THE PC, WINDOWS 4, IS ALSO ON ITS WAY TO BEING AN OVERHYPED SENSATION.

The patent, issued in August but only widely disclosed in November, was roundly criticized as incorrectly issued because the technology covered in the patent was obvious. The Patent Office's move to reexamine the patent before anyone else challenged it is very rare, leading many lawyers to believe that the Office wanted to avoid more bad publicity. The move means that Compton's will not try to get royalties on the patent until the matter is resolved.

The review does not mean that the patent is dead, however; nor does it preclude other companies from challenging the patent if the Patent Office reissues it. Anyone can challenge the patent at any time by showing new evidence of "prior art." The Patent Office's move simply removes Compton's threat to other companies temporarily, and takes some of the heat off of the Patent Office. Coincidental with the debate over the Compton's patent, the Patent Office has started public hearings on software patents to reexamine their scope and necessity in the current marketplace.

WINDOWS 4 NEWS

There is absolutely no doubt that Windows 3.1 is the most important operating system on PCs, but many companies are starting to wonder what the future might hold.

Due to many factors, Windows NT has not sold nearly as well as many predicted a year ago, and it has already fallen from the limelight. Many software developers think that the market for NT software will be minuscule in comparison to the press it received, possibly smaller than the UNIX-on-PCs market. But the next big thing for the PC, Windows 4, is also on its way to being an overhyped sensation.

Windows 4 will have a revised user interface, resembling a menage of Windows 3, the Macintosh, and OS/2. The new features will help make launching more than one program at a time more intuitive. It will also contain OLE 2, Microsoft's structure for letting programs and documents communicate easily. Windows 4 will run 32-bit programs, which will supposedly make it faster. The new version will only run on 386-and-above systems that have at least 4MB of RAM and lots of free hard disk space.

Microsoft demonstrated a very early revision of the Windows 4 software to five thousand developers last month in order to get them excited about converting all their programs to the new system. They also distributed the first development kits for the new version so that the developers who wanted a long lead time could get started. (Windows 4 had previously been called "Chicago," but using the code name for the product when it is so widely discussed is fairly silly.) The meeting did indeed get many companies interested, but also raised many red flags for others.

Like most commercial software, Windows 4 is taking longer to develop than was originally thought. In fact, the release date has already been pushed back twice, and Microsoft was very careful not to commit to the current date, which is officially November of this year. The first release of the developers' kit will only allow vendors to start converting their software; later releases will allow real development.

Of more concern to many developers is the fact that Windows 4 is not really a 32-bit operating system. Microsoft has admitted that much of the internals of Windows 4 will be old 16-bit code, meaning that those portions will probably not run any faster than Windows 3.1, and may in fact be slower because all the data going into those portions will be twice as large as it needs to be. It is not clear yet exactly which portions of Windows 4 will use old 16-bit technology, but if most of the graphics section uses the old code, many users may find no speed increase in Windows 4.

This worries many software developers because, although tens of millions will upgrade to v4 no matter what, other tens of millions might not if the new version turns out to be buggy, late, and/or slow. The expected mass migration to Windows NT that never materialized has spooked many developers, but they know that they can't wait until after Windows 4 is released to start their conversion.

Because the main thrust of the conversion is from 16-bit data to 32-bit data, it will be almost impossible for most developers to use a single copy of their program's source code to create versions for both Windows 3.1 and Windows 4. To make matters worse, Microsoft is still putting a lot into Windows NT, and that market may grow just enough to make it important a year from now when Windows 4 is released.

The next few months may well be difficult for many Windows software companies as they try to decide what to do next. Do they put all their programming resources into new Windows 3.1 technologies like OLE 2, multimedia, and cross-platform systems? Do they allocate their resources towards Windows 4, possibly losing some Windows 3.1 sales in the meantime? Do they start looking at the new Apple/IBM PowerPC systems that are getting a great deal of attention in the media? Do they trust Microsoft's sales projections, even though they have been overly optimistic in the past?

Many will make wrong guesses, and only the largest companies will be able to put enough people on all the different projects without skipping over the next big operating system.

CONNECTING IN 1994: TOO MANY CHOICES?

When it makes the cover of *US News and World Report* and shows up in *Time*, the *Wall Street Journal*, and on the morning news shows, you know that it's the next big thing ready to be misinterpreted. In 1992 and early 1993, bulletin board systems (BBSes) got a great deal of unwanted publicity from tabloid news shows and newspapers who portrayed them as nothing other than pornography mongers. With the backing of Vice President Al Gore, the Internet took most of that limelight away, and a host of magazines has now portrayed the Internet, also known as the National Information Infrastructure and the "data superhighway," as the thing to be talked about in 1994.

To some in the industry, this is a blessing; others worry that this coverage is similar to the way home computers were covered in the same magazines ten years ago as great places to store your recipes and make home budgets.

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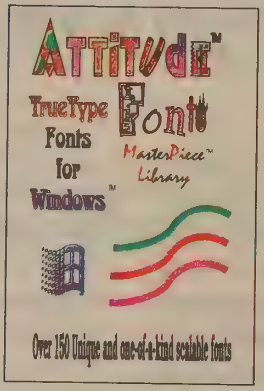
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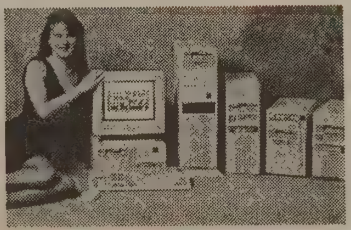

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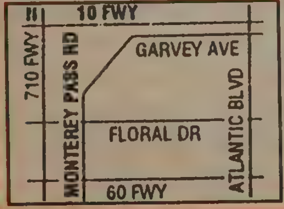

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At the same time as the hype about the Internet gets hot and heavy, the major media companies are starting to make noises about connecting homes through the cable TV system instead of the phone system. The phone companies want to start providing data services, and new players are showing up in the current online arena all the time. It is clear that the future of personal and business networks will not be monolithic, but will instead resemble today's television choices with a few giant (but not really dominant) services, many mid-range conglomerates, and lots of small-to-tiny niche services.

Apple recently announced eWorld, its new online service that will appeal to almost every Apple customer. eWorld will not be available for a few months, and will be available to people using Macintoshes, PCs, and Newtons. In fact, once the software is stabilized, it will come installed on most future Apple computers. Apple hopes to leverage its name to make the service attractive. It will have an uphill battle against America Online, however, because eWorld will be quite expensive ($9 a month for the first two hours, plus $5 per hour after that for evening and weekend use). Other major manufacturers like Microsoft and Novell are looking at starting their own similar systems.

THIS YEAR, MANY PEOPLE ARE LOOKING UP TO THE BIG COMPANIES TO DEFINE THE ONLINE NETWORKING WORLD, BUT THE FUTURE LOOKS EVEN BRIGHTER FOR THE SMALL AND THE LOCAL FIRMS THAT ARE MORE CUSTOMER-ORIENTED.

The major news media are busy covering other potential players in the online services field, the cable companies and the telephone companies. These behemoths are seen as having deep pockets and are therefore threatening to the entrenched leaders like Prodigy, America Online, and CompuServe. Most of these stories ignore the fact that when you think of friendly, modern, and inexpensive service, you rarely think of your cable or telephone company. Although the content is important, and many media giants have the video content, service in this type of industry is even more important, and companies like TCI and Pacific Bell get consistently low ratings on service and support.

Instead, many people will choose to connect to a different source altogether: a local BBS. The BBS industry is experiencing a continued growth rate that matches that of the more traditional online providers, and the quality of information and interface on BBSes is growing at the same rate. Some people prefer WalMarts for size and convenience; others prefer the local grocer. In the same way, many people will get fed up with the national (and international) scope of the large online services or the Internet and look for a local alternative, and will most likely find it in a BBS. Last year, many BBSes began adding big-ticket features like Internet email gateways and graphical user interfaces; by the time the media giants know what they want to do, BBSes will be a real alternative in almost every respect. It costs less than $4000 to start a real BBS system, compared to the tens of millions of dollars that Apple is paying to start eWorld.

The Internet may also prove to be the best of both worlds, providing big access with the possibility of a local feel. Small Internet providers can easily create Usenet news groups for just their system, and can also align with other local providers to make local news groups and mailing lists. Technically, there is no difference between a UNIX system running as an Internet host and a BBS, and creative providers will offer mid-level services to individual users and local businesses.

Ten years ago, the computer industry assumed that size was everything. Apple couldn't compete with a nonstandard computer, and small Asian companies would never get anywhere in the PC world. Both these assumptions were proven wrong. This year, many people are looking up to the big companies to define the online networking world, but the future looks even brighter for the small and the local firms that are more customer-oriented. ■

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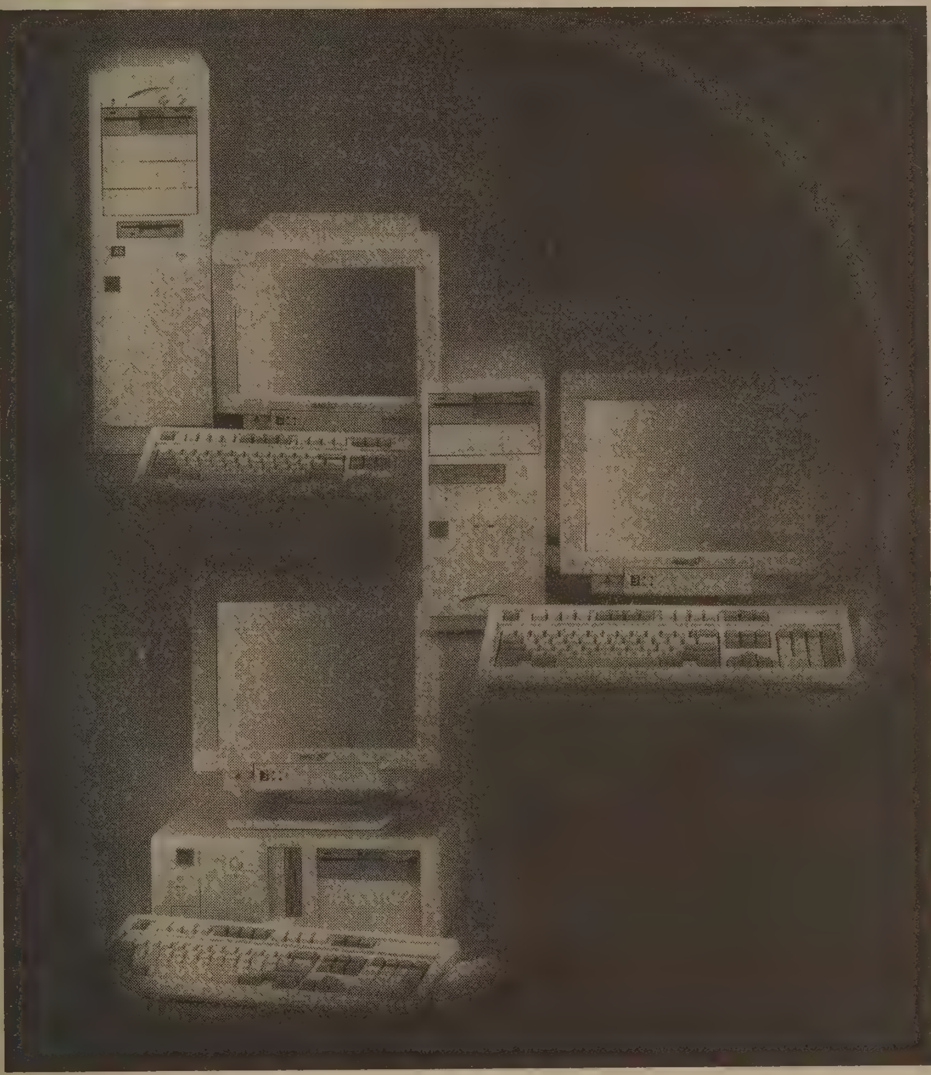

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The Dow Jones Industrial Average tried to keep pace with the MicroTimes Stock Index but rose only 69.2 points, or 1.84%, before reaching a closing mark of 3820.77. The S&P 500 also carved out gains to the tune of 3.52 points, before closing at 469.90.

Turning to MicroTimes stocks of interest:

•Adobe Systems Inc. was embraced by investors during the period, as that stock upticked $5.00, or 23.53%, before finally coming to a closing price of $26.25. Adobe took the largest percentage gained honor for the period. In a recent news release, Adobe announced fourth-quarter net income per share increased to 34 cents from 18 cents recorded one year earlier. The results were above and beyond forecasts of 28 cents a share. Separately, Adobe also announced that it will buy back two million shares, or about 4.4% of its outstanding shares.

•Intel was another gainer in the accompanying chart, as that stock increased $7.88, or 13.58%, and closed at $65.88. Intel was recently repeated as a "buy" by analyst Krishna Shankar at Salomon Brothers. Intel earned an estimated $1.35 per share in the fourth quarter compared to 99 cents per share recorded one year earlier. The actual results should be available by January 18.

•Apple Computer Inc. announced plans with Microsoft Corp. to develop ways that software can work together. The new communications software will run on Microsoft's Windows operating system. Macintosh now runs on a proprietary operating system, but the new software will allow Macintoshes to communicate in networks with PC compatibles.

In other news, Apple was downgraded by analyst James Poyner at Oppenheimer & Co. to "underperformer" from "market performer." Apple added $3.63, or 12.29%, before reaching a closing price of $33.13.

•Pacific Telesis was put in the sell column, as investors shed their shares to the tune of $2.13 per share. Pacific Telesis announced after-tax charges to fourth-quarter earnings of $576 million for reserves to reduce its work force and "system reengineering." The company will also take a $496 million after-tax charge for FAS 106 and 112 obligations. According to Standard & Poor's, the charges should not affect the company. Pacific Telesis closed at $54.25. ■

EXCH	COMPANY		TICKER SYMBOL	CLOSING PRICE 12/17/93	CLOSING PRICE 01/07/94	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
	SOFTWARE											
OTC	Adobe		ADBE	21.25	26.25	5.00	23.53	21	0.20	0.76	37.00	16.25
OTC	Aldus	(H)	ALDC	23.75	25.50	1.75	7.37	50	0.00	0.00	27.50	13.25
OTC	Autodesk		ACAD	44.50	45.88	1.38	3.09	20	0.48	1.05	56.75	37.00
OTC	Borland		BORL	15.38	15.00	–0.38	–2.44	–	0.00	0.00	27.25	12.75
OTC	Informix		IFMX	18.75	19.00	0.25	1.33	24	0.00	0.00	27.25	13.38
OTC	Lotus	(H)	LOTS	56.38	59.25	2.88	5.10	63	0.00	0.00	59.25	19.00
OTC	Microsoft		MSFT	80.50	85.25	4.75	5.90	26	0.00	0.00	98.00	70.38
OTC	Novell		NOVL	20.13	21.75	1.63	8.07	–	0.00	0.00	35.25	17.00
OTC	Oracle		ORCL	34.88	31.75	–3.13	–8.96	47	0.00	0.00	37.75	13.31
OTC	Software Publishing		SPCO	7.50	8.00	0.50	6.67	–	0.00	0.00	14.50	5.50
OTC	Symantec		SYMC	15.63	15.88	0.25	1.60	–	0.00	0.00	20.50	9.25
	HARDWARE											
OTC	Apple		AAPL	29.50	33.13	3.63	12.29	52	0.48	1.45	65.25	22.00
OTC	AST Research		ASTA	23.25	23.63	0.38	1.61	–	0.00	0.00	25.50	12.75
NYS	Commodore		CBU	3.38	3.75	0.38	11.11	–	0.00	0.00	7.63	2.50
NYS	Compaq	(H)	CPQ	74.25	77.75	3.50	4.71	16	0.00	0.00	77.88	41.75
NYS	Digital Equipment		DEC	35.38	36.38	1.00	2.83	–	0.00	0.00	49.25	34.13
OTC	Dell		DELL	23.88	25.75	1.88	7.85	–	0.00	0.00	49.88	13.50
NYS	Hewlett–Packard		HWP	77.88	83.00	5.13	6.58	18	1.00	1.20	89.25	64.38
NYS	IBM	(H)	IBM	59.75	58.88	–0.88	–1.46	–	1.00	1.70	60.00	40.63
NYS	Silicon Graphics	(H)	SGI	22.75	23.88	1.13	4.95	35	0.00	0.00	24.75	11.75
OTC	Sun Microsystems		SUNW	27.13	29.63	2.50	9.22	18	0.00	0.00	41.00	21.13
NYS	Xerox	(H)	XRX	88.63	90.75	2.13	2.40	–	3.00	3.31	91.00	69.88
NYS	Tandy	(H)	TAN	48.38	46.63	–1.75	–3.62	31	0.60	1.29	50.75	24.63
	CPU'S											
NYS	Advanced Micro Devices		AMD	17.88	18.38	0.50	2.80	7	0.00	0.00	32.88	17.00
OTC	Intel		INTC	58.00	65.88	7.88	13.58	14	0.20	0.30	74.50	42.75
NYS	LSI Logic		LSI	14.13	16.63	2.50	17.70	18	0.00	0.00	19.25	10.25
NYS	Motorola		MOT	87.50	89.63	2.13	2.43	29	0.44	0.49	107.50	48.75
	COMMUNICATIONS											
NYS	AT&T		T	54.63	54.63	0.00	0.00	18	1.32	2.42	65.00	50.75
NYS	BellSouth Corp.		BLS	57.63	55.50	–2.13	–3.69	17	2.76	4.97	63.88	50.63
OTC	MCI		MCIC	26.50	27.38	0.88	3.30	22	0.04	0.15	29.88	18.81
NYS	Northern Telecom		NT	29.38	32.63	3.25	11.06	–	0.36	1.10	46.00	21.38
NYS	Pacific Telesis		PAC	56.38	54.25	–2.13	–3.77	25	2.16	3.98	59.25	43.25

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES	25
DECLINES	6
UNCHANGED	1
NEW HIGHS	7
NEW LOWS	0

MOST ACTIVE ISSUES:

LARGEST DOLLAR GAINER	Intel	$	7.88
LARGEST DOLLAR LOSER	Oracle	$	–3.13
LARGEST PERCENTAGE GAINER	Adobe		23.53 %
LARGEST PERCENTAGE LOSER	Oracle		–8.96 %

	CLOSE 12/17/93	CLOSE 01/07/94	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD
MICROTIMES STOCK INDEX	4644.25	4866.50	222.25	4.79
DOW JONES INDUSTRIAL AVERAGE	3751.57	3820.77	69.20	1.84
STANDARD & POOR'S 500 INDEX	466.38	469.90	3.52	0.75
N.Y.S.E. COMPOSITE	257.79	260.34	2.55	0.99
NASDAQ COMPOSITE	759.23	782.94	23.71	3.12

CLOSING QUOTES FOR GRAPH:

DATE	MICRO TIMES	DOW JONES
05/27/93	4554.50	3554.83
06/24/93	4266.52	3490.61
07/22/93	4072.42	3525.22
08/23/93	4264.70	3605.98
09/17/93	4212.67	3613.25
10/18/93	4473.13	3642.31
12/17/93	4644.25	3751.57
01/07/94	4866.50	3820.77

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- 72 Hour Burn-In Test

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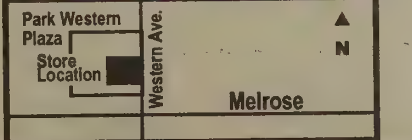

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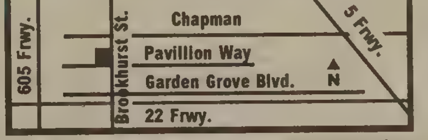

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1 YEAR PARTS WARRANTY
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- CARRYING CASE
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- DOS 6.0
- CARRYING CASE
- 1 YEAR WARRANTY

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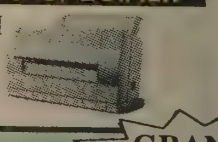

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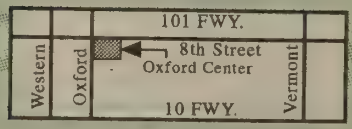

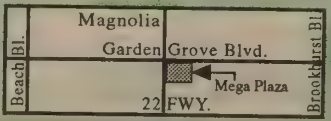

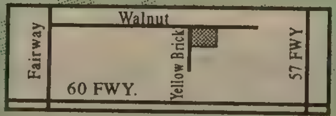

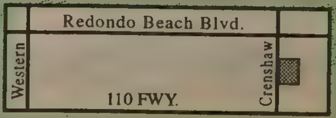

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486DX/40MHz
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- 200W POWER SUPPLY
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- SUPER I/O & IDE CARD
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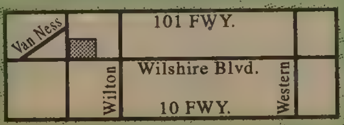

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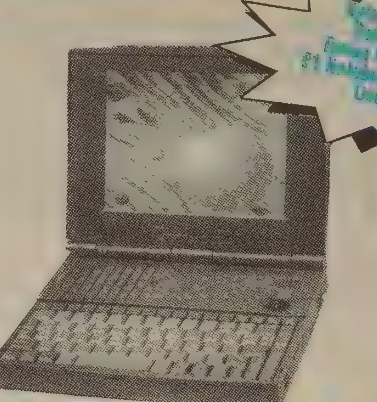

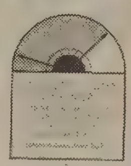
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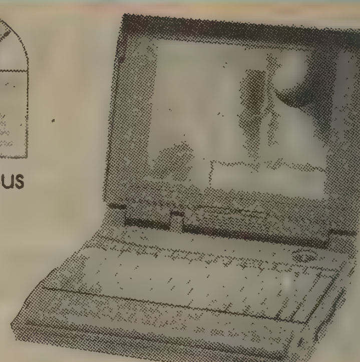

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486DX2-50	$1865	$2385	$3385
486DX2-66	$2015	$2555	$3540

120MB Deduct	$60
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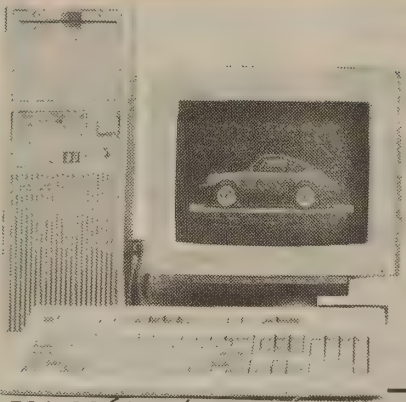

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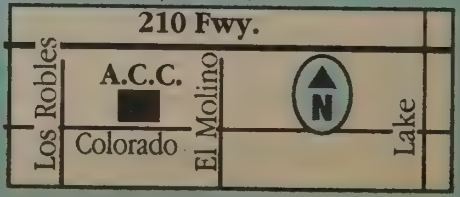

Techno-Civics & Techno-Politics:

Power To The People

BY JIM WARREN

REALIZABLE FANTASIES

These columns concern the future—fantasies that are rapidly being realized through the efforts of us all.

COMPUTER-AIDED VOTERS

Last month's column outlined how political disclosures can be computerized and made publicly available—state and local campaign-finance reports, state and local statements of officials' personal economic interests, and state lobbyists' disclosures. These can all be computerized at almost no cost to anyone—at least not beyond what it already costs those who are required to submit pre-landfill disclosures (paper).

Just about anyone with a computer and a modem can have access almost immediately, from almost anywhere, usually for free. California has about fifteen million computer users; 850,000 to 1.5 million of them already have Internet access. Many tens of thousands of others use about fifteen hundred FidoNet BBSes around the state (bulletin board systems), as well as thousands of other networked BBSes.

In California, there are currently more than nineteen thousand state and local filers—candidates, campaign committees, major donors, senior elected and appointed officials, large and not-so-large lobbyists (including numerous under-funded good-government and public-interest lobbyists), and so on.

There are about twenty to thirty thousand state-level filings per year, each ranging from a few pages to several thousand pages—though each page contains relatively little information. It appears that even the largest state filing (e.g. for a gubernatorial candidate) can easily fit on a single floppy diskette (probably even without using data compression). All of the information disclosed in all of California's state filings can trivially fit onto a 3 to 5GB hard disk (about $5000?), even if *all* of them were stored in wildly oversized fixed-length ASCII records without compression.

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Note: State filings do *not* include most local political disclosures. Those are filed with, and made available to the public by, cities, towns, counties, school districts, and the other local agencies—but the information filed in a local jurisdiction totals *much* less than the massive state filings (except for San Francisco and Los Angeles, which are required to receive and provide access to *both* their own jurisdiction's filings and all of the state-level filings).

IMPLEMENTATION PLAN FOR DIGITAL DISCLOSURES

The day after New Year's, I forwarded a 28-page implementation proposal to about thirty legislators and other officials who had requested it or had otherwise expressed interest in low-cost computerized disclosures. Titled "Computerized Political Disclosures: Doing It With Minimal Cost and Maximum Utility," it is modeled largely after my May 1993 proposal for implementing Assembly Bill 1624 (Bowen-D). AB1624 mandated free statewide and global online public access to comprehensive state legislative information—now enacted as Cal. Gov. Code 10248 and implemented essentially as I proposed (though costing perhaps five times my $10,000 estimate). Note: These proposals are generic in nature; I have no business or financial interest in their adoption.

If recipients like the new political-disclosures proposal, Sen. Tom Hayden (916/445-1353) may amend his SB758 (Senate Bill) based on the proposal. Assembly Member Jackie Speier (916/445-8020) may introduce legislation further extending the mandate for computerized disclosures to include lobbyists (covered in my proposal at Speier's request).

By the time this is in print, the Commission on the Future of the California Courts should have released its comprehensive recommendations for totally revamping the state and local court system.

On January 3, within hours of my faxing an Executive Summary of the proposal to a number of legislators and officials, including Chief Deputy Secretary of State Tony Miller (916/445-6371), he faxed back a copy of his letter of the same date, in which he asked the leading candidates-to-be for Governor (Wilson, Brown, Garamendi) to voluntarily file their forthcoming campaign disclosures in computerized form, as well as the currently required paper form.

Fuel freedom's fire! Send *your* matching request to the candidates.

This *is* the nation's leading high-tech state, at the end of the twentieth century. Isn't it time the body politic had *modern* access to crucial decision-making information?

For connected readers, electronic copies of the implementation proposal—named "polidisclos.r3"—are available by anonymous ftp (Internet file transfer protocol) from cpsr.org in /cpsr/states/california/polidisclos, or on the WELL in /home/j/w/jwarren, in Mac Word 5 and RTF formats. For a wasteful paper copy, send a self-addressed, $2.13-stamped, 9"x12" envelope to me at 345 Swett Rd., Woodside, CA 94062.

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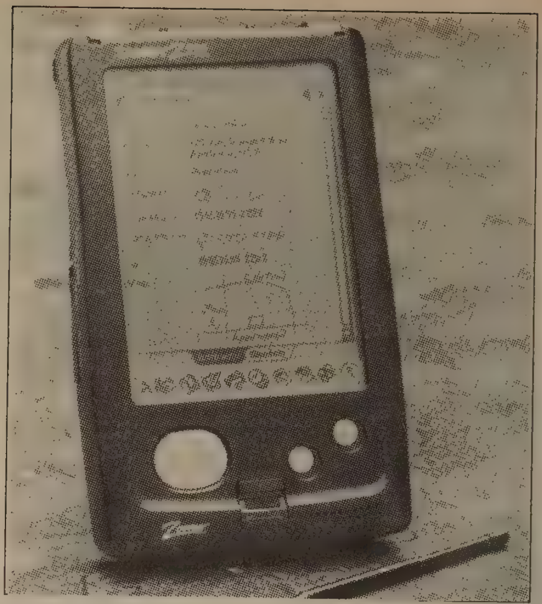
FIRST, THE LEGISLATURE; NOW, ALL OF OUR GOVERNMENT

Assembly Member Tom Bates (Oakland-Berkeley area, 916/445-7554) introduced legislation on January 3 that would mandate comprehensive public access to already-computerized public records via the computer nets.

Assembly Member Debra Bowen (Torrance area, 916/445-8528)—sponsor of AB1624—is reportedly planning to introduce legislation to further mandate "electronic access to government" (no details as

continued on page 114



The Zoomer: Casio/Tandy's PDA

Plus: Daytimer™ For Newton, PCMCIA Products, File Transfer Software

BY MITSU HADEISHI

PENS AND PALMTOPS

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The Casio/Tandy Zoomer is a pen-based palmtop intended, quite clearly, to compete with the Apple Newton in functionality, appearance, and price. Closely resembling the Apple Newton's appearance, the Zoomer (also known as the Tandy Z-PDA or the Casio Z-7000) is even priced similarly at $600.

Measuring 4.25" x 7" x 1", the machine is also very close in physical dimensions to the Apple product; a bit too large to fit into a pocket comfortably, it is still small enough for a briefcase or jacket pocket. It comes with a serial port, an infrared port for unit-to-unit connection, a PCMCIA card slot for memory and peripheral expansion, and an earphone jack. However, don't let appearances deceive you: under the hood, things are quite different indeed.

HARDWARE: NEEDS MORE ZOOM

Firstly, the processor in the Zoomer is much less powerful than the RISC chip present in the Apple Newton. As a result, the unit is a lot slower than the Newton, and therefore capable of much less sophisticated handwriting recognition. Overall, the Zoomer simply "feels" more sluggish; it often takes several seconds to recognize and process your handwriting after you've finished writing something. In addition, it's considerably less "intelligent" than the Newton about recognition; rather than using neighboring letters as context, the machine simply recognizes one character at a time. This means it tends to make a lot of errors right in the middle of your words, where they are difficult to correct.

A friend of mine who's an avid user of the Newton was very curious to see the Zoomer; however, after using it for a short time, the first thing he said was "Wow, it's slow," followed by "I'm glad I bought a Newton."

My brother, a novice with pen-based systems but very fond of his organizer (so fond he refers to it as his "brain," carrying it with him in his pocket), was impressed by the appearance of the Zoomer, but when he used it, his reaction was "I don't like this," then, "There's no keyboard!" and then, after playing with it for a little while, "It's too slow."

> **The Zoomer comes with a considerably larger number of built-in applications than does the Apple Newton.**

My wife, after using the unit for a considerable amount of time, said that some of the claimed handwriting features didn't work very well (or at all); for example, using the back of the pen as an "eraser." She was also annoyed that you could not rest your hand on the screen, because, being a touch-sensitive device, it mistook this for pen pressure. This is not a problem with the Apple Newton, since its screen reacts only to their special stylus.

The pen in the Zoomer is a retractable device which fits in a little slot at the bottom of the unit. It's a bit tricky to get it out; the first few times I tried, either the pen did not emerge from the unit at all, or it would shoot out, flying across the room. After a little practice, I'm sure you could get used to it and be able to remove it without having this problem.

SOFTWARE: A BIG PLUS

The Zoomer comes with a considerably larger number of built-in applications than does the Apple Newton.

Perhaps this can be partially attributed to the fact that the Newton has a few megabytes of ROM devoted to its sophisticated (and large) operating system; the Zoomer, by contrast, runs GEOS, an operating system developed by GeoWorks, which is very compact yet quite powerful as well.

GEOS by itself is a very nicely built operating system; written originally for the Commodore 64, it was later ported to the IBM PC and is therefore well suited for handheld applications because of its compact RAM footprint.

Included with the Zoomer are a scheduler application; a notepad application; Pocket Quicken (a handheld version of the popular personal finance program); a calculator; a dictionary; a "form calculator" with built-in "forms" for doing financial computations and conversions; a world clock; a word-by-word language translator; a database of consumer, US, and international information; an interface program for the America Online service; three simple

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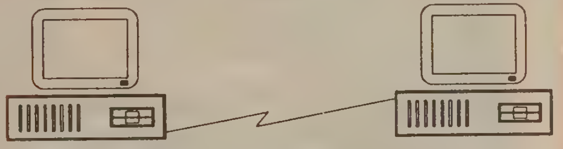

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games; and a file manager. This is in contrast to the Newton, which essentially comes with just a clock, notepad, address book, and scheduler application.

The address book allows for both text and handwritten information, so you can, for example, draw a map and store it with the address. The date book includes six month, one-month, one-week, and one-day views; it's fully functional and also allows mixed text and graphics storage. The note book allows for a hierarchically organized table of contents and can contain mixed drawings and text. Pocket Quicken has a clear graphical windowing interface, much like the Windows version, and lets you keep track of multiple accounts, income, and expenses. The Zoomer includes a graphical file manager, much like the one in GEOS for the PC, which allows you to launch applications as well. Thus you can install new applications on the unit which will appear in the file manager, and can be launched from there.

The applications are well integrated using the GEOS operating system, and the user interface is fairly uniform between the different applications. There are some omissions, however; for example, in the address book, you can select the part of the book you want with the pen, but not with the built-in arrow keys.

Nevertheless, most things about the user interface of the applications are relatively intuitive, except that the poor handwriting recognition makes almost every application a pain to use. It is difficult to enter data into the address book. It's quite difficult to get the machine to recognize your handwriting for rapid note-taking sessions. In general, it seems to be better to store handwriting (instead of trying to use the handwriting recognition task to convert to text), because it's faster and less error-prone.

The unit ships with 4MB of ROM, 1MB of RAM, and runs under GEOS 2.0. Of that one megabyte of RAM, 350K or so is available for user information (as a RAM disk); the rest is used by the system to run applications. The batteries last about one hundred hours according to the manual, comparable to other handheld devices such as the Sharp Wizard or the Casio B.O.S.S.

TO BUY OR NOT TO BUY?

The bottom line here is: Is this unit useful?

I have to conclude that although the Newton has its flaws, and is a first-generation product, it is, in the end, actually useful (at least for some people), which it achieves only after including a state-of-the-art handwriting recognition algorithm and a fast RISC processor. I'd personally say the Zoomer, by contrast, falls just on the other side of the line, in the realm of the not quite usable. The handwriting recognition is still just too slow and inaccurate for effective daily use. If you don't mind storing your information as scrawled handwriting, then perhaps you could use this machine without too many problems; however, many things need to be converted to text, for text searches and the like.

I wouldn't buy one myself. Although the Newton isn't for everyone, it is possible to get a reasonable amount of work done with it. The Zoomer, by contrast, is so difficult to use using the rather poor letter-by-letter recognition scheme that it is, at least at first, rather too cumbersome and slow.

It's possible that if you trained yourself carefully, you could write clearly enough to get sufficiently high recognition rates to satisfy your needs. However, this doesn't seem easy to do, given the difficulty several of us had trying to use this unit. Though the GEOS operating system itself is quite nifty and the applications generally seem to be well designed and well written, the

continued on page 118

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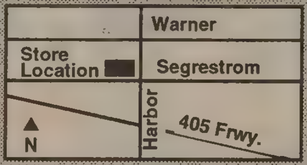

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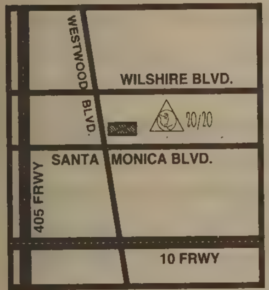

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The New BJ-10sx Bubble Jet Printer Offers Portability And Flexibility

BY ED KAHN

RESOURCES:

Canon BJ-10sx Printer, $349
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2995 Redhill Ave.
Costa Mesa, CA 92626
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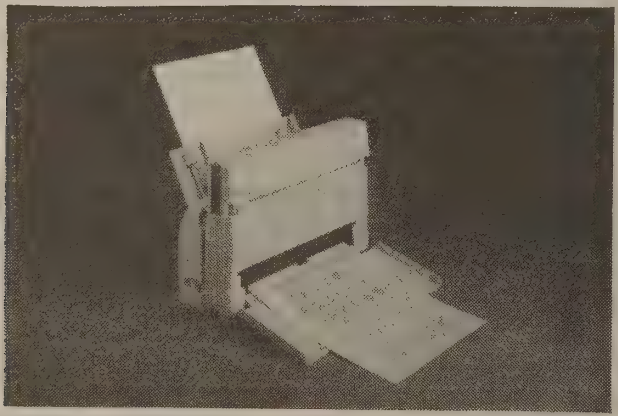
LAPTOPS

Not very long ago, to print good quality documents, you needed a laser printer. More recently, users are finding that bubble jet printer technology offers a good high-quality printing alternative. While a laser printer may still be preferable, on-the-go users do not always have that option. Fortunately, there are several lightweight, portable bubble jet printers that get the job done almost as well.

The BJ-10sx is Canon's most advanced portable printer to date. This is an excellent printer for those who need portability and flexibility. The basic printer can be used with either the included AC power supply or an optional rechargeable battery pack ($50). The battery pack can print about forty pages before it needs recharging.

The BJ-10sx measures about 9" x 12" x 2" and is small enough to fit nicely inside a briefcase. It weighs 3.7lbs., excluding the AC adapter or the battery pack, which add an additional 9.9oz. To print a single sheet, simply raise the cover and drop in the paper. The printer works at 110cps, whether you choose the high-quality or economy mode. I definitely like its simplicity. While you can control a number of things from the front panel and the dip switches, printing is as simple as inserting paper and telling your computer to print.



If you are also using this printer at home, you may want to buy the optional cut sheet feeder ($90), which holds up to fifty sheets of paper. The feeder is almost the same size as the printer itself, but weighs only 2.9lbs. When you use the BJ-10sx with its cut sheet feeder, the unit takes on a whole new look. You turn the printer on its edge and attach the feeder to what had been its bottom. The printer now sits vertically. Paper is stacked in the feeder at the back of the printer. Operation is simple and painless. Loading a stack of paper is easy, and the paper feeds out the front of the machine onto a table or desk.

WHEN YOU USE THE BJ-10SX WITH ITS CUT SHEET FEEDER, THE UNIT TAKES ON A WHOLE NEW LOOK. YOU TURN THE PRINTER ON ITS EDGE AND ATTACH THE FEEDER TO WHAT HAD BEEN ITS BOTTOM.

Other portable printers do a good job, but often require some compromise. I was not forced to give up any of the features I want in order to use this unit. Envelopes are fed from the bottom or back, depending upon whether you use the cut sheet feeder or not. Although only #10 size business envelopes will work, they load simply and print well. I found that envelopes are as easy to feed into this printer as any other small printer.

This printer is designed to be used with computers running Windows 3.1. The documentation instructs you how to install the proper driver into Windows. This part was pretty straightforward and simple. But I had to do a fair amount of experimenting to find a typeface I liked and to tell the Windows setup that I wanted 360 x 360 resolution in order to get the quality that approaches laser output.

Bubble jet technology offers excellent quality, but there are a number of variables that can affect your output. Paper quality is especially important. Paper that is too absorbent yields pages on which the ink bleeds. When you look closely, you will see uneven edges to the letters. On a bond paper with at least 25% cotton content, print quality will be excellent.

For users who are not working in the Windows environment, the BJ-10sx works with other printer drivers, including several of the most popular IBM and Epson models.

Bubble jet technology relies on a print head that sprays tiny dots of ink onto the paper or transparency. The BJ-10sx uses an ink cartridge ($25) that can print between four hundred and five hundred pages in high-quality mode and twice that number in economy mode. The ink, by the way, is waterproof. This is a feature I really appreciate after having too many envelopes smeared when I leave them out for the mail carrier. Cartridges are literally a snap to replace.

A 37K buffer assures that the printer will free your computer up as soon as possible so you can get on with your other tasks. The documentation that comes with the printer is excellent. If you simply want to know how to connect your computer to the printer and get on with the printing, the *Quick Start Guide* will get you going in minutes. If, however, you want to know the details of how the system works and what the cable pins control, you can find this information in the *User's Manual.* Everything is explained in simple terms, and a glossary tells you the meaning of most of the terms used. I did notice, however, that dithering is not in the glossary. Oh well.

This Canon BJ-10sx printer comes with a two-year warranty. If you want a printer to take on the road, this is a good model to consider. It also works well for everyday use if your printing volume is moderate. ■

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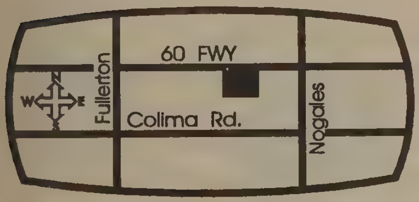

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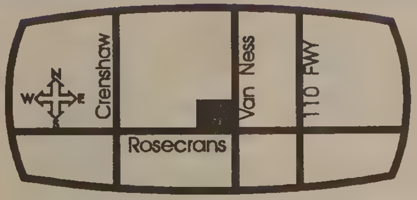

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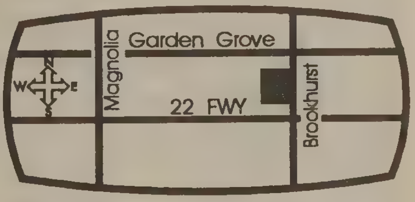

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COMPUTER OF THE MONTH:

The NCR 3150 Active Matrix Color

AT&T was not the first company to jump into the laptop market, but when it did come out with its initial offering, it made a big splash. It was set apart from the rest of the field by distinctive design and a module of software products that put an emphasis on communications, including fax and email. Now, with NCR well absorbed into the AT&T family, laptops are being introduced under that name.

Their newest lightweight computer is a beauty. AT&T's current line of portables includes a high-end machine that is actually made for them by NEC and is virtually identical to the NEC Versa series except for a few modifications. The NCR 3150, an entry-level model, comes in three configurations: monochrome, passive matrix color, and active matrix color. This month I am evaluating the active matrix color model.

Not very long ago, there was a significance between active and passive matrix displays. Both the gap in quality and the price differential are closing rapidly. Nowadays, you will pay only a couple of hundred dollars more for an active matrix display. The display on the 3150 is top of the line and gorgeous. Except for size and if you need Super VGA, there is little need for an external display. The 9.5" screen (measured diagonally) provides a VGA display that I can work on all day with no eye strain. The computer uses local bus technology, which gives fast video response and makes the system perfectly suited for Windows. And, by the way, if you purchase the monochrome model, it can be upgraded at a later date to a color display.

RESOURCES:

NCR 3150 Notebook Computer, \$2025–\$3845
NCR/AT&T
1700 S. Patterson Blvd.
Dayton, OH 45479
1-800-637-2600

There are many things besides the brilliant color to like about this notebook, but before I get lost in hyperbole let's get the basics out of the way. The 3150 is powered by an 80486SX-25MHz central processor. It comes standard with 4MB of RAM, but is expandable by an extra 4MB (\$245), 8MB (\$460), or 16MB (\$1905) through the addition of user installable memory cards. An 8K cache also gives extra speed to the system.

The hard drive is removable, which means you can select from an 80MB, 120MB (extra \$100), 170MB (extra \$200), or 250MB (extra \$400) drive and easily upgrade at any time. A 3.5" floppy drive is also included with the system. The 3150 weighs 6.2lbs. and measures 11" x 8.5" x 1.9".

YOU CAN BUY LESS EXPENSIVE PORTABLES, BUT THIS IS DEFINITELY A CLASSY COMPUTER LOADED WITH FEATURES AND FLEXIBILITY.

The keyboard is as good as you can expect from a machine of this size. The port on the side of the 3150 will accept either a full-size keyboard, a numeric keypad (\$75), or a mouse. NCR provides a trackball that attaches to the front of the unit and is convenient for on-the-go use.

A nickel metal hydride rechargeable battery comes standard and extra batteries (\$225) are available. An extremely sophisticated power management system is built into the computer, and under optimal conditions you may get three or four hours of use from a fully charged battery.

The ports offer flexibility in the way you set up

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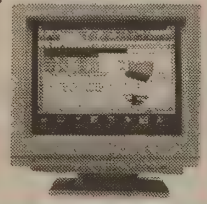

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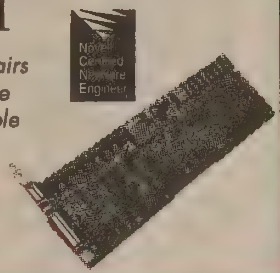

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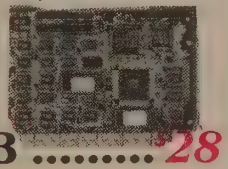

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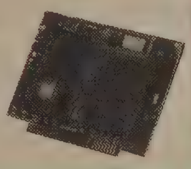

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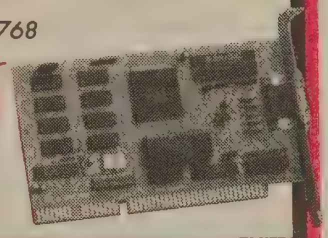

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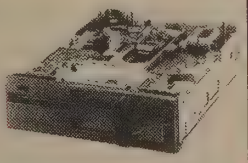

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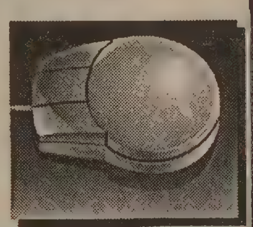

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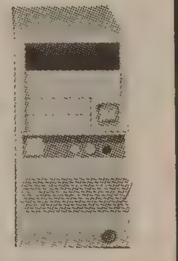

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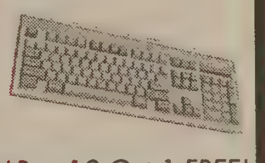

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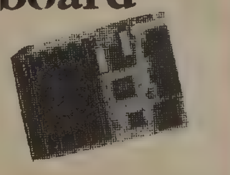

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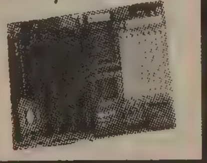

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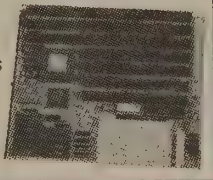

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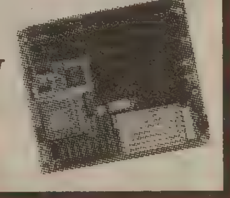

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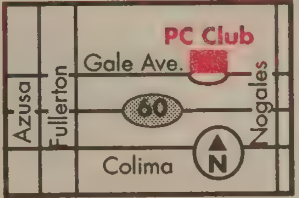

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your machine. In addition to the PS/2 keyboard port, there is a parallel and serial port as well as a bus connector for the addition of a SCSI adapter. There is also a Type II PCMCIA slot designed for either a fax/modem or network card ($350). Two models of fax/modem cards are available from NCR. The deluxe 14,400/14,400 baud model costs $595.

Although NCR does not provide a modem as standard equipment, it is clearly its intention that users will add this option. The preloaded software includes both BitFax and AT&T Access Plus software to facilitate sending faxes and electronic mail. NCR also provides MS-DOS 6.0 and Windows 3.1. When you power-up the machine for the first time, you are presented with an introduction that will familiarize you with the features and operation of the hardware and software. This is a terrific way to begin using your new computer. Also, all documentation is online rather than in a book. Printed documentation is available as an option.

What marks this computer as an entry-level machine is its inability to connect to a docking station. Nevertheless, with the exception of adding adapter cards, you can load this machine up pretty well.

The NCR 3150 comes with a three-year warranty—the first year including on-site service. A carrying case is included and various options are available. This is a superb machine in every respect. If you are new to computers, NCR has designed this notebook to hold your hand as you get started. If you are an old hand at computers, you will be impressed by the power and design features of this package. You can buy less expensive portables, but this is definitely a classy computer loaded with features and flexibility. ■

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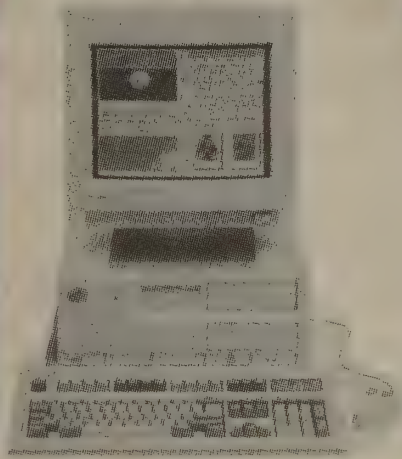

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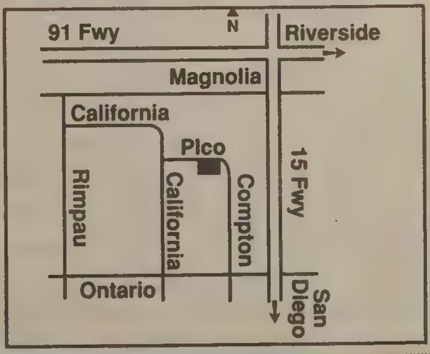

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Internet Access For The Armchair Explorer: Gopher

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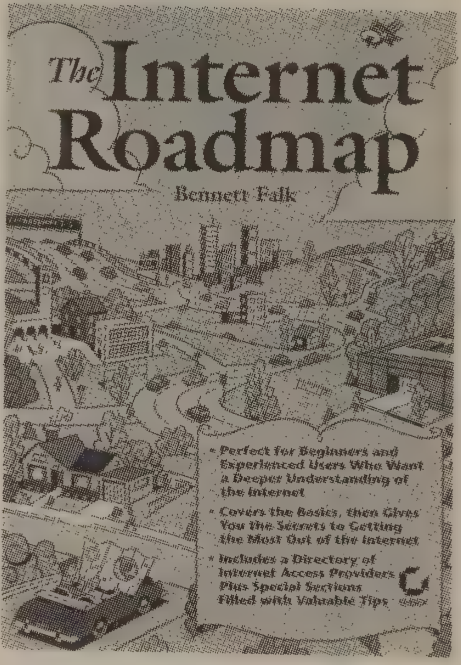
The Internet Roadmap
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• Perfect for Beginners and Experienced Users Who Want a Deeper Understanding of the Internet
• Covers the Basics, then Gives You the Secrets to Getting the Most Out of the Internet
• Includes a Directory of Internet Access Providers Plus Special Sections Filled with Valuable Tips

"Chloe, are you playing with that Internet thing again? do you have to spend so much time on that computer?" Chloe's mother Sarah stood in the doorway blocking the light from the hall. The 15-year-old spoke but did not look up. "It's not 'play,' mom, I'm learning things. You should try this sometime, you'd like it."

"I can't get interested in computers for their own sake, Chloe. If there were something of value, like a women's network or something, I might be interested." Sarah stepped into the room and sat on the bed. Chloe continued to look at the screen. "In a way, there is a women's network, you know," she said.

"On the computer? I didn't know that," Sarah replied. "Where is it?" Chloe gave a command, and a menu appeared on the screen listing topics by and for women. She moved aside and offered her mother the chair. "There," she said, "This menu goes on for twelve screens, and all the items on it are women's items."

Sarah scanned the menu. "Where did this come from?" she asked.

"It's from all over the Internet. I just asked to see all the items that have 'women' in the title. They aren't all winners, and some are duplicates. But when you weed out the things you know you don't want to see, you can find the really interesting stuff a lot faster." But Sarah had already selected an item and was skimming through the text of a recent speech delivered by the First Lady.

WHAT GOPHER IS

If you are fascinated with the Internet's information resources but have a low tolerance for FQDNs, IP addresses, directory names, user names, passwords, and file types, the Internet **gopher** is the tool you've been waiting for. Technically, **gopher** is a "distributed document delivery system." Fortunately, it's much more appealing (and more fun to use) than that description makes it sound. In practice, gopher is something like an easy-to-use **ftp** without walls. That is, you can retrieve files via **gopher** without knowing which Internet host contains the file or what directory the file is stored in. The aim of the **gopher** application is to bring you information from all over the Internet as seamlessly as possible. Unlike any other application we've discussed so far, **gopher** doesn't require you to memorize a domain name or login information. You won't even have to remember which **gopher** server manages the information you want to retrieve. **Gopher** is so successful at hiding the boundaries between machines and servers that the term "Gopherspace" has been coined to refer to the complete pool of information resources managed by **gopher** servers throughout the Internet.

Because **gopher** is so easy to use, it has become an extremely popular vehicle for publishing information on the Internet. There are more than 750 **gopher** servers spread throughout the Internet. Many of these are devoted to specialized areas of interest. For example, there are at least five servers managing information on plant genome projects. Many businesses use **gopher** servers to reach the Internet audience. There is, for example, a **gopher** server for The New Republic. There are also **gopher** servers for nonprofit organizations and advocacy groups such as the Electronic Frontier Foundation (EFF). Apart from its advocacy work, the EFF **gopher** is host to a number of electronic periodicals that challenge the conventions of mainstream journalism. **Gopher** provides a congenial medium for these and many more activities.

Gopher was developed in 1991 at the University of Minnesota. The **gopher** development team there continues to work on enhancements and extensions of the system, and the UM **gopher** server remains the Mother Gopher. Unlike **ftp**, **telnet**, and **mail**, **gopher** is an application designed for the current state of the Internet. It assumes that there will be lots of users, that the users shouldn't be bothered by the details of managing client/server connections, that each connection from client to server should be as brief as possible, and that the physical network is fast enough to perform well even if the client program must open a connection for each query it sends to the server.

HOW GOPHER WORKS

When you run a **gopher** client program on an Internet host, it connects to a **gopher** server elsewhere on the Internet. By default, clients connect first to the Mother Gopher at the University of Minnesota, and from this connection you can maneuver from server to serve throughout the Internet. If you know that the resources you're after are managed by a different gopher, you can bypass the Mother Gopher entirely and make your initial connection to the **gopher** that manages the data you're interested in. To do so, you need to supply the fully qualified domain name of the server's host and the port it monitors for connections. Port 70 is usually reserved for **gopher** servers. To start a **gopher** session with the server at the University of Nevada at Reno, use this command:

```
gopher gopher.unr.edu 70
```

(The UNR **gopher** has a particularly rich **veronica** database. You may want to refer back to this address during the discussion of **veronica**.)

After a connection is established, the client asks the server for a short listing of the resources it manages. The server's resources are organized hierarchically, usually in a tree-like directory structure. The first listing a server sends is the root level of this directory hierarchy. The client program formats the listing into a menu and displays

continued on page 43

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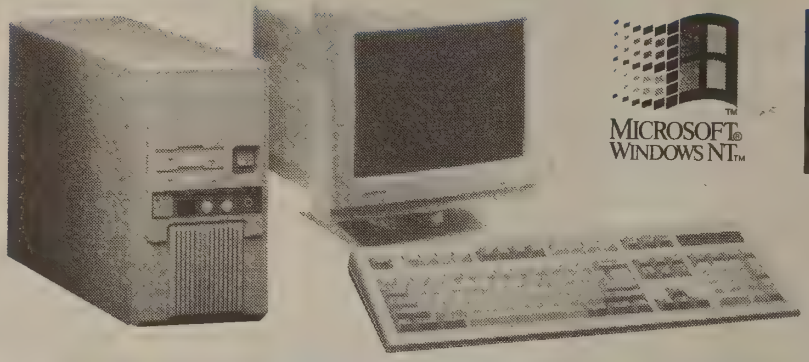

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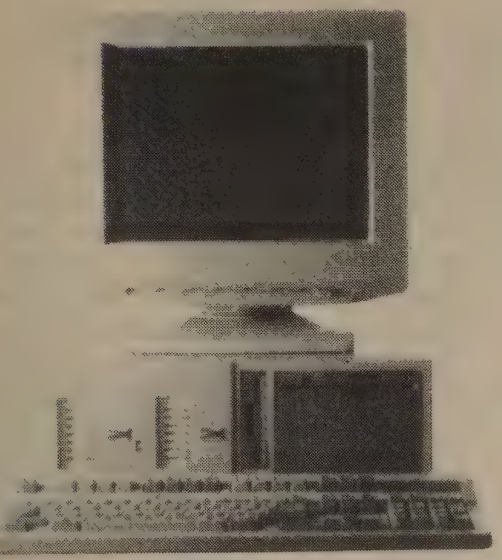

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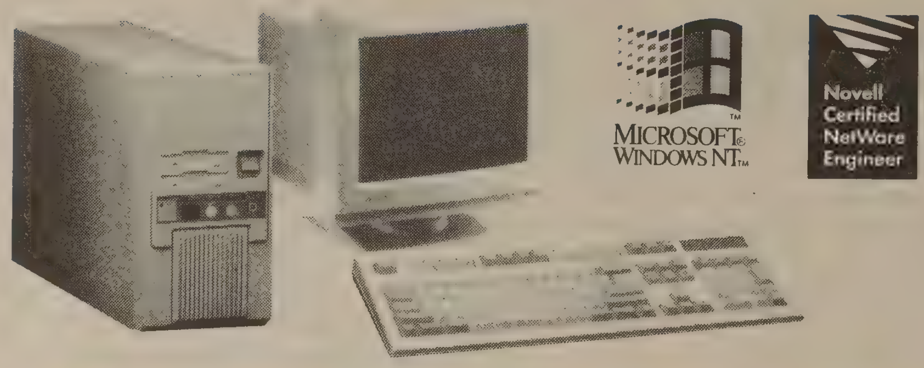

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continued from page 38

it on your screen. When you select an item from this menu, the client relays your choice back to the server, and the server does whatever is appropriate for that kind of item. If the item you selected is a directory, the server sends back a listing of that directory's contents, and the client presents that to you as a menu. If your selection is a file, the server will send the client the contents of the file. When the client receives a file, it checks the file type and does whatever is sensible for a file of that type. If the file is text, the client displays it, and after you've looked at it, you'll have the option of printing, mailing, or saving the file locally. If the file is binary, the client will prompt you for a file name to use when saving the file locally.

GOPHER MENUS AND THE OBJECTS BEHIND THEM

At first glance, you might think that **gopher** is just a tool for browsing through files and directories. After all, it recognizes six different kinds of files. When file selections appear in a menu, **gopher** indicates what kind of file (ASCII, Binary, DOS Binary, etc.) or directory the item stands for. As you rummage through **gopher** menus, however, you'll find that many of the menu items point to resources outside the **gopher** server you've connected to. The files and directories that menu items point to may be on another Internet host elsewhere. In fact, a menu item on one **gopher** server may point to resources under another **gopher's** control. Some **gopher** servers contain no data at all, only links to other **gopher** servers. Your client program will deal equally well with both

table 6.1: Gopher Objects, their Identifiers, and Icons

MENU ITEM TYPE	GOPHER IDENTIFIER	ICON
File	0	-none-
Directory	1	/
BinHexed Macintosh File	4	<HQX>
Uuencoded file	6	-none-
DOS Binary file	5	<PC Bin>
Binary file	9	<Bin>
Graphics File in GIF Format	g	<Picture>
Image File	i	<Picture>
Index Search	7	<?>
Telnet Session	8	<TEL>
Telnet 3270 Session	T	<3270>
CSO Phone-book Server	2	<CSO>
Error	3	-none-

listing 6.1:
A Sample gopher Menu Showing Different Item Types

```
                Internet Gopher Information Client 2.0

                             Sample  Menu

-->  1. Plain File.
     2. Listing of /tmp Directory  /
     3. CSO phone-book server <CSO>
     4. Macintosh BinHexed file <HQX>
     5. DOS Binary File <PC Bin>
     6. Index Search <?>
     7. Telnet Session to optimism <TEL>
     8. Binary  File <Bin>
     9. Telnet to 3270-based host <3270>
    10. Graphics file in GIF format <Picture>
    11. Image file <Picture>
```

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servers, and unless you ask for technical information about the menu item, you won't know which **gopher** server the resource is really located on.

Some **gopher** menu items are not files at all, but gateways to programs or to other application (that is, non-**gopher**) servers. Through a gateway menu item you could trigger a **telnet** session from your local computer to another machine across the Internet or request a keyword search on the contents of the current directory. A **gopher** menu item can represent any of a dozen different things, and most **gopher** menus include icons indicating what type of object each item represents. Internally, **gopher** uses single-character identifiers to name each object type. Most of the time the identifiers are safely out of view, but, as you'll see later, when you ask for information about an item, **gopher** displays the identifier without telling you what it stands for. The list of **gopher** objects, their identifiers, and icons appears in Table 6.1.

A few of the objects **gopher** recognizes may be new to you. **Telnet** 3270 is a special implementation of the **telnet** program to connect to IBM computers that use the 3270 "block mode" terminal. A CSO Phone-book Server is a tool for maintaining a campus-wide phone directory. Index Searches are used to retrieve files containing keywords that you specify. **Gopher** provides an interface to index searching tools of various kinds. One popular indexing and retrieval tool on the Internet is the Wide-Area Information Server (WAIS). WAIS itself isn't discussed in this book, but you don't need to know about WAIS in order to query WAIS indexes through **gopher**. Index searches are discussed in more detail later in this chapter. A sample menu showing menu items with icons appears in Listing 6.1.

GETTING PREPARED TO USE GOPHER: WHAT YOU'LL NEED

To use **gopher**, all you need is Internet access and a **gopher** client program to run on the computer that provides your Internet connection. If you're working on a UNIX system and using the terminal-based version of the **gopher** client (as opposed to the version for a graphical user interface like Xwindows), you'll need to know what kind of terminal you're using. **Gopher** is a "full-screen" application, and it needs to know some features of the terminal you're working on. On many Internet hosts, your terminal type will be set for you automatically when you first log in. If your terminal type can't be determined automatically, the system may ask you for a terminal type as part of the login procedure. In any case, if the display is scrambled when you run **gopher**, you'll still be able to quit the program by typing Ctrl-C. After **gopher** exits, you can change the terminal type.

listing 6.2: The Mother gopher's Root Menu

```
            Internet Gopher Information Client v1.11

            Root gopher server: gopher.tc.umn.edu

 -->   1.  Information About Gopher/
       2.  Computer Information/
       3.  Discussion Groups/
       4.  Fun & Games/
       5.  Internet file server (ftp) sites/
       6.  Libraries/
       7.  News/
       8.  Other Gopher and Information Servers/
       9.  Phone Books/
      10.  Search Gopher Titles at the University of Minnesota <?>
      11.  Search lots of places at the University of Minnesota  <?>
      12.  University of Minnesota Campus Information/
```

Unlike **ftp**, **telnet**, and **mail**, **gopher** is not bundled with any commercially available operating system or network software. Consequently, there may be no **gopher** client installed in the computer that provides your Internet access. The surest way to test this on a UNIX system is to issue the **gopher** command. If you get the message "Command not found," try again, but this time add the path name **/usr/local/bin**, the directory that most UNIX systems use for locally installed software:

/usr/local/bin/gopher

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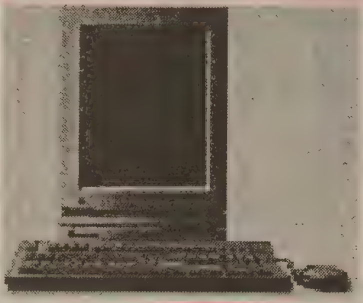

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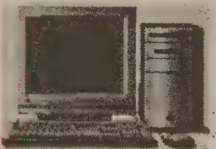

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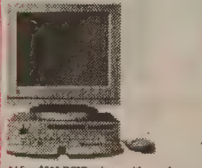

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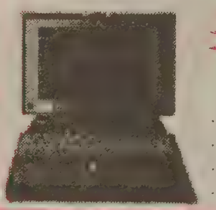

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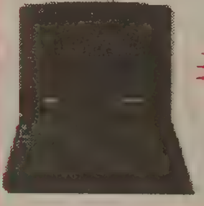

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gopher is installed and what the appropriate command is to run a **gopher** client. If **gopher** is not installed, you can get a copy from the University of Minnesota via anonymous **ftp**. If you're working on a UNIX system, you'll need to retrieve the source code for **gopher** and compile it. Novices shouldn't try to do this without help. If a personal computer provides your point of contact with the Internet, you can retrieve an already compiled client program.

If you're unable to install a **gopher client** on the computer that connects you to the Internet, **gopher** is also available via **telnet**. Table 6.2 lists some of these sites and the information needed to connect to them. **Telnet** to the host nearest you and use the login name for that host from the table. The list of sites that offer **telnet** access to **gopher** clients is subject to change. Consult Yanoff's Internet Services List (Chapter 3 shows how to get there) for sites added recently.

USING GOPHER

When you run a **gopher** client and connect to the Mother Gopher at the University of Minnesota, you'll see the menu in Listing 6.2. You can select a menu item by typing its number or you can move the cursor to the desired item with your terminal's arrow keys. Pressing Return will select the item, and the item type will determine what **gopher** does next. Typing a **?** will display a summary of the commands that can be executed from a **gopher** menu. Listing

listing 6.3:
Gopher Command Help

```
                         Quick Gopher Help
                         -----------------


Moving around Gopherspace
-------------------------
Press return to view a document

Use the Arrow Keys or vi/emacs equivalent to move around

Up ..................:  Move to previous line.
Down ................:  Move to next line.

Right Return ........:  "Enter"/Display current item.
Left, u  ............:  "Exit" current item/Go up a level.


>, +, Pgdwn, space ..:  View next page.
<, -, Pgup, b .......:  View previous page.

0-9 .................:  Go to a specific line.
m   .................:  Go back to the main menu.

Bookmarks
---------
a : Add current item to the bookmark list.
A : Add current directory/search to bookmark list.
v : View bookmark list.
d : Delete a bookmark/directory entry.

Other commands
--------------
s : Save current item to a file.
D : Download a file.
q : Quit with prompt.
Q : Quit unconditionally.
= : Display Technical information about current item.
O : change options.
/ : Search for an item in the menu.
n : Find next search item.

The Gopher development team hopes that you find this software useful.
If you find what you think is a bug, please report it to us by sending
e-mail to "gopher@boombox.micro.umn.edu"
```

listing 6.4:
Getting Information About a gopher Menu Item

```
Name=Information About Gopher
Type=1
Port=70
Path=1/Information About Gopher
Host=gopher.tc.umn.edu
```

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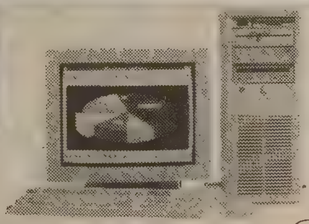

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6.3 shows the **gopher** help message.

Most of the time, you will not need any additional information about the items in a **gopher** menu. However, if you want to see the access information **gopher** has about an item, position the cursor on that item and press the = key. Listing 6.4 shows what **gopher** reports when you ask for information about an item. In this example, we asked for information about the first item in the Mother Gopher's Root Menu. **Gopher** tells us the item's name, its type (type 1 items are directories), the path for getting to the object and a host name and port number that can be used to find the object.

With a terminal-based **gopher** client, there is usually room for 18 menu items on a single screen, and it is common for **gopher** to present directory listings that span several screens. In the lower-right corner of the display, **gopher** shows both the current page and the number of pages for the directory being listed. You can move your view of the listing forward and backward a page at a time with the > and < keys. Notice that moving from page to page in one listing is different from going up to the parent menu (with the **u** command).

Another tool for searching through multi-page menus is the / command, which searches for a word or string in the names of the menu items in the current listing. Remember that the / command searches for the keyword only in the names of the menu items. Searching the contents of menu items requires an "index Search" menu entry and a full-text index.

CREATING GOPHER MENUS AD HOC

One of the most powerful features of the **gopher** software is that you can dynamically create new menus that combine items from various other menus. There are three tools that make this possible: bookmarks, index searches, and **veronica. Gopher's** bookmark capability allows you to maintain a list of **gopher** menus that you visit frequently. At any time during a **gopher** session, you can retrieve this list and use it as you would any other menu. Bookmarks and information about them are managed by the **gopher** client program. **Veronica** is a database that contains the names of menu items in all the **gopher** servers that can be reached from the University of Minnesota **gopher**. You query the **veronica** database from a **gopher** menu item that prompts you for keywords. Menu item names that contain your keywords are returned to you as a menu. Finally, index searches enable you to query a **gopher** server for files that contain a keyword you specify. Keyword searches are only possible on files that have been indexed, so you'll have to depend on whoever maintains the files to provide an index and a menu item that allows you to submit queries. Let's look at each of these features in greater detail.

BOOKMARKS IN GOPHER

Navigating through directories one level at a time using menus is easy but tedious. If there are **gopher** menus that you use frequently, bookmarks are a way to relieve the tedium. **Gopher** bookmarks are shortcuts that take you directly to the desired menu or item without winding through all its parent menus.

When you locate a menu item that you know you'll want to visit again, simply position the cursor on that item and type **a** to add the item to your list of bookmarks. To add a bookmark for the current directory, use A. Doing this will add access information for the current item to a local file that stores the configuration of your **gopher** client. (On UNIX systems this file is named **.gopherrc.**) You can view a list of your bookmarks by typing **v. Gopher** will present the bookmarks to you as a menu, and you can move to any item by simply selecting it. If you want to delete a bookmark from the list, first issue a **v** command to display the list. Position the cursor on the item to be deleted and type **d.** Because bookmarks are stored in your local configuration file, they are present whenever you start a **gopher** session.

VERONICA: AN INDEX TO GOPHERSPACE

Veronica stands for "Very Easy Rodent-Oriented Net-wide Index to Computer Archives." It performs for gopher the same service that archie provides for **ftp** archives: it is a searchable index of the titles of menu items on **gopher** servers throughout the Internet. **Gopher** has become an immensely popular tool for publishing information in the Internet community. However, as more **gopher** servers have come online, the job of searching through **gopher** menus to find what you're looking for has become more complicated. **Veronica** is an application that maintains a database of menu item titles from any **gopher** server that can be reached from the Mother Gopher at the University of Minnesota. There are veronica databases at a number of different sites, and their contents vary

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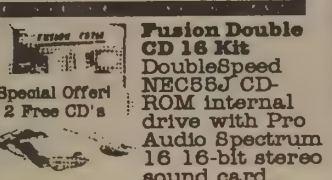

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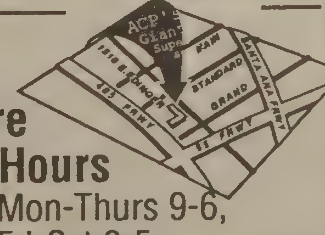

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listing 6.5:
Searching the veronica Database

```
                  Internet Gopher Information Client v1.11

                      Search gopherspace using veronica

      1.  Search gopherspace at NYSERNet <?>
 -->  2.  Search gopherspace at UNR <?>
      3.  Search gopherspace at PSINet <?>
      4.  Search gopherspace at University of Pisa <?>
+------------Search gopherspace at UNR-----------------+
|                                                      |
| Words to search for  small business                  |
|                                                      |
|                   [Cancel ^G] [Accept - Enter]       |
|                                                      |
+------------------------------------------------------+


Press ? for Help, q to Quit, u to go up a menu    Page: 1/1
```

listing 6.6:
Results of a veronica Query

```
            Internet Gopher Information Client v1.11

            Search gopherspace at UNR: small business

 -->  1.  R4: NCI-CM-27729-72 PRECLINICAL TOXICOLOGY AND PHARMACOLOGY
OF D
      2.  NCI-CM-27729-72 PRECLINICAL TOXICOLOGY AND PHARMACOLOGY OF
DRUG
      3.  At the Small Business Development Center, Academe Gets Down
to Bus
      4.  nsf9318     - NSF 93-18 - Small Business Innovation Research
(SBIR
      5.  sei91414    - 4-14  Small Business Innovation Research
(SBIR) awar
      6.  sei91414.wk1- 4-14  Small Business Innovation Research
(SBIR) awar
      7.  sei91415    - 4-15  Small Business Innovation Research
(SBIR) awar

      8.  sei91415.wk1- 4-15  Small Business Innovation Research
(SBIR) awar
      9.  DOE Small Business Innovation Research Grants.
      10. Food and Agricultural Sciences Small Business Innovation Res.
      11. DOD ONR Small Business Innovative Research Program.
      12. Digestive Diseases and Nutrition Small Business Innovation R.
      13. Defense Life Sciences Small Business Innovation Research.
      14. Space Life Sciences Small Business Research.
      15. Small Business Development Centers.
      16. Western Virginia Small Business Development Consortium.
      17. Hirshber -- ERIC Review: Enterpreneurship and Small Business
Devel.
      18. Community-Development-and-Small-Business/
```

somewhat. You may need to query more than one of these to find the information you're looking for.

Veronica databases are queried from a **gopher** menu. The menu item you select to begin a **veronica** search has the same icon as other index searches (<?>). Listing 6.5 shows the screen that prompts for keywords in a **veronica** query. In this example, we're querying the **veronica** database at the University of Nevada at Reno (UNR). The menu from which we're querying provides access to several different **veronica** servers and allows you to set the scope of the query. A query of gopherspace will return menus of any type. You can choose a menu item that only looks for a match in **gopher** menu items that point to directories. Directory queries generally return faster, but querying all of gopherspace will give you a more detailed picture of what is available. The prompt for keywords reminds you of which type of query you selected. To query for menu item titles that contain the words "small" and "business," you simply type those words and press Return. The results of this query will be displayed as a menu, and the first page of the result menu is shown in Listing 6.6. This query produced enough menu items to require six menu screens. (The first two menu items returned by **veronica** have long titles that are truncated and don't look like they have anything to do with small business. In fact both are Requests for Proposals (RFPs) that are classified as "Small Business Setasides."

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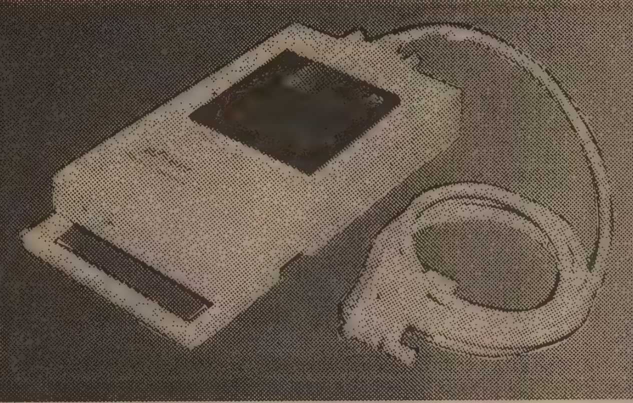

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INDEX SEARCHES

Like any other menu-based system, **gopher** makes your access to information easier by giving you a clear view of your choices at every step of the way. Often, however, you will have only the names of the menu items to guide you in making selections from **gopher** menus, and you'll have to do a lot of browsing to find what you want. If the group of files you're interested in has been indexed, you can use the index to identify files that contain the keywords you specify. Usually you will be dependent on whoever publishes the files to provide an index.

When you're using the terminal-based **gopher** client, index searches appear as menu items with the "<?>" icon. The name of the menu item usually indicates what files the index covers. After you select an index search item, **gopher** will prompt you for keywords to be looked up in the index. When you press Return, the **gopher** server will search the index for your keywords and build a menu in which each item points to a file containing your keywords. If you specify several keywords, most indexes searchable through **gopher** will count a file containing any of the words as a successful match. If nothing in the index matched your keywords, the result menu will contain an item saying there were no matches. It may also contain items describing the contents of the index or suggestions for phrasing queries effectively.

FURTHER INTO GOPHERSPACE

A little **gopher** knowledge will go a long way. You've learned the basics of starting a **gopher** client and probing for information with menus, bookmarks, the **veronica** database, and index searches. Once you're comfortable with using **gopher** to find Internet resources, you may find that **gopher** is the ideal tool for producing an information resource of your own and publishing it for the Internet community. Setting up a **gopher** server is only slightly more complicated than using a **gopher** client. To learn about creating **gopher** servers or to develop more advanced skills using **gopher**, you'll need some additional documentation.

Documentation on the Internet comes in many forms. There are FAQs (compilations of Frequently Asked Questions) about many topics. FYIs (For Your Information bulletins) and RFCs (Request for Comment) are generated to inform the Internet community of (and invite commentary about) proposed standards. In the USENET Net News there are open forums about a wide range of topics. **Gopher** documentation comes in all of these forms. There is a **gopher** FAQ that is updated periodically. Information about the design of **gopher** and the **gopher** protocol can be found in RFC 1436. And **gopher** is the subject of a USENET newsgroup named **comp.infosystems.gopher**.

These disparate sources of information are collected in a single menu item titled "Information About Gopher" on the Mother Gopher in Minnesota. (This is the first menu item on the Mother Gopher's root menu. The contents of the "Information About Gopher" menu are shown in Listing 6.7. A separate FAQ for **veronica** is maintained at the University of Nevada at Reno and is available via **gopher**. Finally, if you're working on a UNIX system that has the **gopher** client software installed, the first place to look for help is the on-line manual. Type **man gopher** to see the manual entry for the client program. If the **gopher** manual pages have not been installed, you'll get the message "No manual entry for gopher." ■

listing 6.7:
the information about gopher menu

```
Internet Gopher Information Client v1.11

Information About Gopher

--> 1.  About Gopher.
2.  Search Gopher News <?>
3.  Gopher News Archive/
4.  comp.infosystems.gopher (USENET newsgroup)/
5.  Gopher Software Distribution/
6.  Gopher Protocol Information/
7.  University of Minnesota Gopher software licensing
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8.  Frequently Asked Questions about Gopher.
9.  Gopher+ example server/
10. How to get your information into Gopher.
11. New Stuff in Gopher.
12. Reporting Problems or Feedback.
13. big Ann Arbor gopher conference picture.gif <Picture>
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- Low magnetic & electricfield radiation

$1675

NANAO Flexscan F550i-W

$30 Rebate

- **17"**, Full flat screen Invar Shadow Mask
- Ultra high resolution and wide usage with auto-adjusting H. scan frequencies from 30 kHz to 65kHz
- 65kHz H.scan frequency with 75Hz high refresh rate for flicker-free 1280 dots x 1024 lines resolution
- Advanced Image Control for automatic picture adjustment and color control
- Low magnetic field and electric field radiation

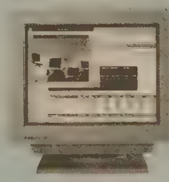
$1135

NANAO Flexscan 9080i

- **16"**, 1280 dots x 1024 lines, Non-interlaced
- 75Hz high refresh, flicker-free 1024 dots x 768 lines resolution
- A microprocessor-based digital control system for automatic picture adjustmentn
- Low frequency magnetic induction and magnetic radiation

$670

NANAO Flexscan F340i-W



- **15"**, Full flat screen Invar Shadow Mask
- New power save feature
- 1024 x 768 at flicker-free 75Hz refresh
- Microprocessor control for pic. & color
- Low magnetic & electricfield radiation

$675

AWARDS

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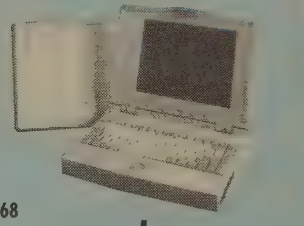
- 7.7 Lbs. w/Bubble Jet Printer Inside

Canon INNOVA 486TX

Active Color 4hr



- Intel 486SL-25Mhz (Low Power) W/Math-Co
- 4Mb RAM up to 20Mb
- 3.5" 1.44Mb Floppy Drive
- 120Mb Hard Disk (Removable)
- Build-in Trackball Mouse in Center
- SMI Power Saving
- PCMICIA Type III Slot
- 1 Serial, Parallel, Keyboard, VGA, Mouse
- 9.5" TFT Active Color 640x 480, Ext. 1024 x 768
- Weight: 6.7lbs W/Battery
- MS-DOS 6.0, Windows 3.1, Works, Preload.

$3425

Canon

- Intel 486SX-25
- 4Mb RAM
- 120Mb Hard Disk
- 3.5" 1.44Mb Floppy Drive
- 9.5" Mono Passive LCD 640 x 480,
  9.5" Dual Scan Color Passive LCD 640
- 1 Serial, Parallel, VGA, Mouse, Fax/Modem 9600/2400 (Send/Rece
- Build-In Trackball mouse in center
- Weight: 6.3lbs W/battery
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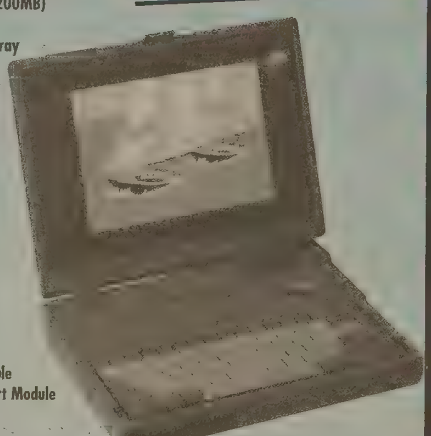
DUAL-400

Removable Hard Drive

Replaceable Module Pack



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- 4MB RAM, Easy to Expand up to 20MB
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- Simultaneous CRT & LCD Operation
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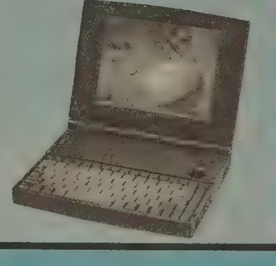
- Trackball (Standard) Module
- Fax/Modem (9600/2400bps) Module
- Lan Adapter Module / 2nd Serial Port Module
- PCMCIA* Type II Interface Module
- Scanner Module / SCSI Module
- AT Expansion Box (Four 16-bit Slots & One 8-bit Slot)

	MONO	DUAL SCAN COLOR	ACTIVE COLOR
486SX-33, 4MB/120MB	$1695	$2245	$3210
486DX-33, 4MB/120MB	$1765	$2375	$3350
486DX2-66, 4MB/120MB	$1995	$2605	$3580

NP-800

LOCAL-BUS

PCMCIA



- Intel 486DX-33 Upgrade to 66
- 4MB RAM up to 20MB
- 120MB Hard Disk (200MB Option)
- 9.5" Mono 640x480 Backlit LCD
- 9.5" Du-Scan/Active color screen
- Two PCMCIA II Slots or one PCMCIA III
- Built-in Track Ball Mouse, Weight 6.1 lb.
- Carrying Case AC/DC Adapter

	MONO	DUAL SCAN	ACTIVE COLOR
486SX-25 4MB/120MB	$1635	$2250	$3395
486DX-33 4MB/120MB	$1810	$2425	$3570
486DX2-66 4MB/120MB	$2050	$2695	$3875

NP-20

- 4MB Standard Expandable to 8MB
- 120MB HD (200MB optional)
- 3.5" 1.44MB Floppy Drive
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- 110 Characters Per Second
- Laser-Like Printer
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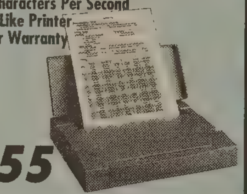

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- 100 Sheets or 10 Envelope
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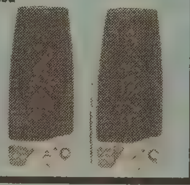

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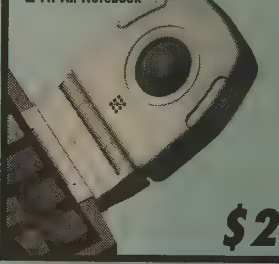

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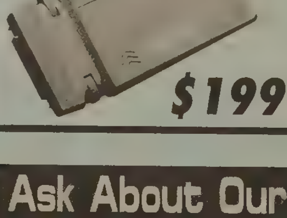
SmartLink Pocket Size Fax/Modem

14,400 bps



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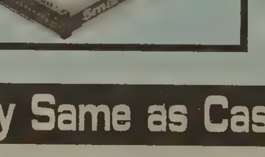
V.32, V.32bis
V.42, V.42bis
w/NMP5

$189



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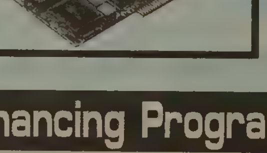
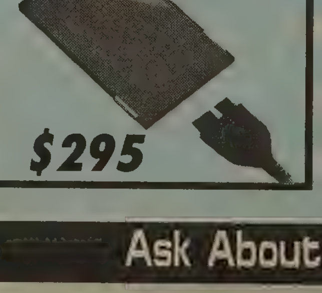
V.32, V.32bis
V.42, V.42bis
w/NMP5

$139



PCMCIA 14.4K Fax/Modem



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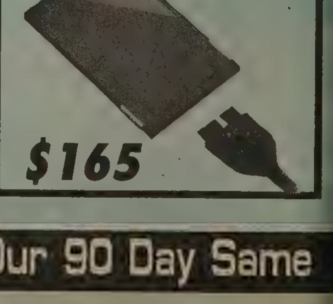

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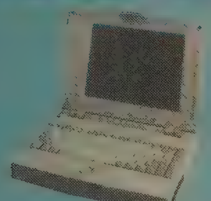
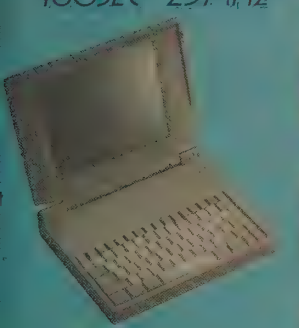


	MONO	Dual Scan
486SX-25 4MB,120MB	$1595	$2265

486SLC- 25MHz



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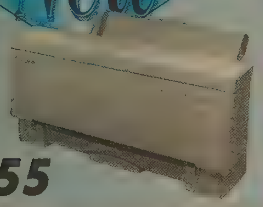

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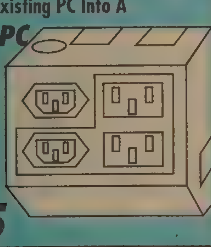

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PCMCIA

- 4Mb RAM, 1K cache
- Ext. 1.44Mb Floppy Drive
- 80/120Mb Hard Disk Removable
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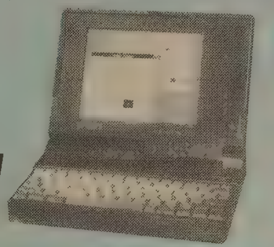
- 7.5" Mono LCD Passive 640 x 480, 64 gray
- Build-in 2 botton Trackball mouse
- 1 Serial programmable, Parallel, Mouse, VGA, Keyboard Port
- 79/80-key keyboard
- Lightweight: 3.85lbs
- Small: 1.5" x 10" x 7.6"
- MS-DOS6.0, Windows 3.1 Preload
- One Year Road Serivce In U.S.



$Call

NP-602 486SLC-33

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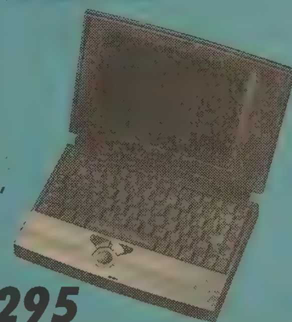
- 1.44Mb Floppy Drive
- 120Mb HD Removable
- 10" Mono LCD Passive 640 x 480, 64 gray
- Build-in Trackball Mouse
- 1 Serial, Parallel, Mouse, VGA(800 x 600), Keyboard, Port
- 83-key keyboard
- Lightweight: 5.5lbs
- Demensions: 8.7" x 11.1" x 1.65"



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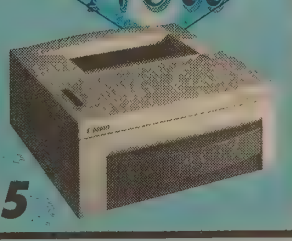

$585

EPSON ActionNote 4SLC/33

- 486 SLC/33
- 4Mb RAM, 1K cache
- 1.44Mb Floppy Drive
- 80/120/180Mb HD
- 10" Mono LCD Passive 640 x 480, 64 gray
- Logitech Trackman Trackball Mouse
- 2 Serial programmable, Parallel, Mouse, VGA, Keyboard, Fax/Modem Port
- 79/80-key keyboard
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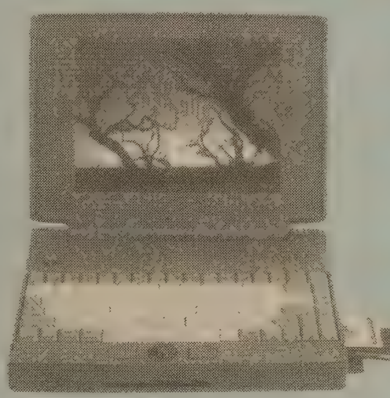
- 120Mb Hard Disk (Removable) up to 340Mb *
- Build-in Trackball mouse in center
- PCMCIA Type III Slot
- 2 Serial, 1 Parallel, VGA, Mouse Keyboard, Docking Port
- 9.5" Mono/Du-Scan/Active 640 x 480 , 64 Gray Ext. 1024 x 768 W/1Mb RAM
- Weight: 5.8lb W/battery
- MS-DOS 6.0, Windows 3.1 Preload



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486DX-33, 4MB,120MB	$1925	$2535	$3435
486DX2-66, 4MB,120MB	$2235	$2845	$3645

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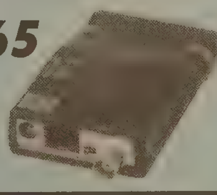

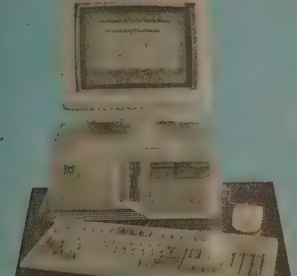

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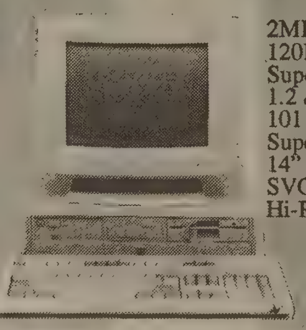

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101 Enhanced Keyboard
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(256KB Cache)
200W Power Supply
Supply Mini-Tower Case
4MB RAM
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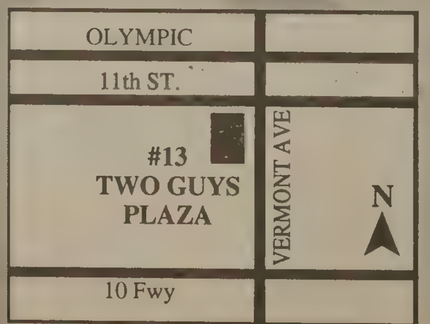

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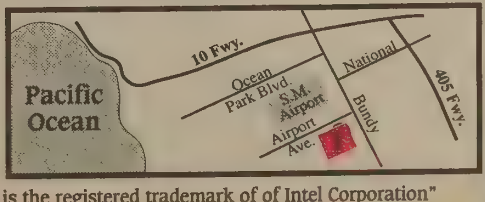

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486 DX2-66	[illegible]
486 DX-50	[illegible]
486 DX-33	[illegible]

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- 256K CACHE MEMORY • PENTIUM READY
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486 DX2-66	[illegible]
486 DX-50	[illegible]
486 DX-33	[illegible]

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486 DX-50	[illegible]
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486 DX-33	[illegible]

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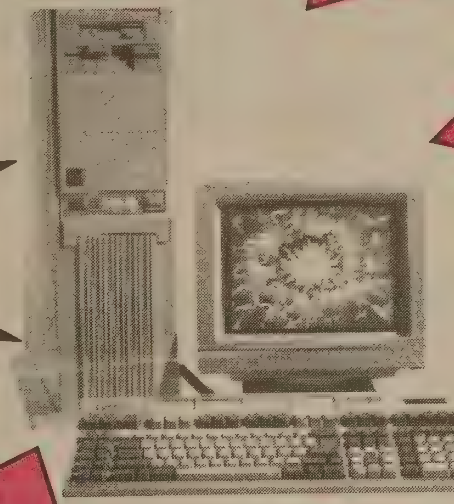

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- 101 Keyboard(Japan)
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- 2S/1P/1G
- Hi-Res. Mouse
- 101 Keyboard(Japan)
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- 32 Bit VESA Local Bus Super VGA Card W/1MB (Windows Accelerator, 1280x1024, 16.7M Color)
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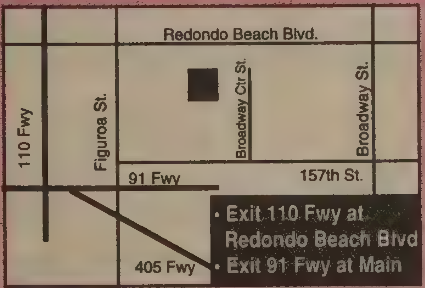

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- Mini-Tower Case

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- SVGA Monitor (.28dp) Non-Int.
- 32Bit SVGA Graphic Card
- 101 Enhanced Keyboard
- 1 Parallel Port
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- 32Bit IDE Controller
- Mini-Tower Case
- 1 Game Port

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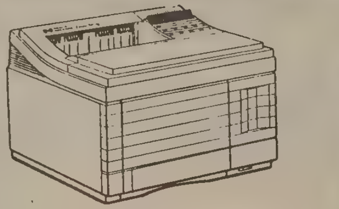

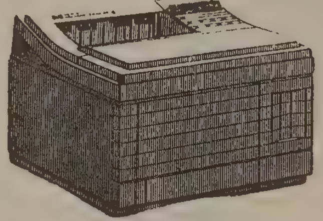

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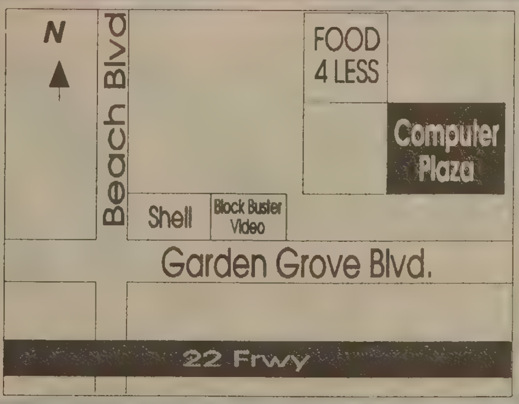

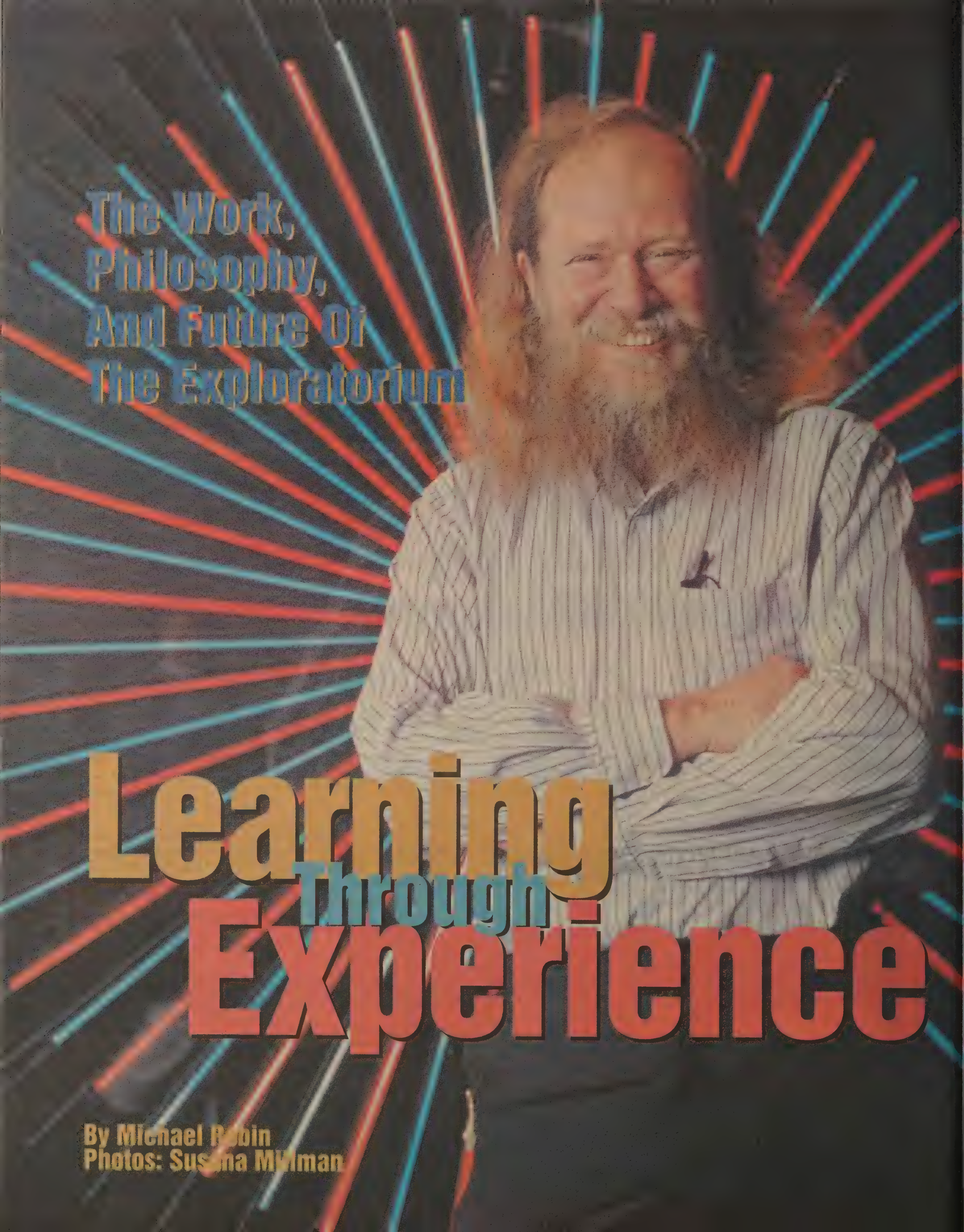

The Work, Philosophy, And Future Of The Exploratorium

Learning Through Experience

By Michael Robin
Photos: Susana Millman

> **“If people feel they understand the world around them, or, probably, even if they have the conviction that they could understand it if they wanted to, then and only then, are they also able to feel that they can make a difference through their decisions and activities.”**
>
> **—Dr. Frank Oppenheimer**

Dr. Frank Oppenheimer, known to everyone as Frank, had a vision that continues to live within the organized mayhem of San Francisco's Exploratorium Museum. As a physicist, teacher, and founder of the Exploratorium he worked to demystify science and empower individuals with a greater understanding of the world around them—an understanding of natural phenomona. Towards this goal he worked to fill the Exploratorium with exhibits “designed to make things clear rather than to cultivate obscurantism or science fiction.”

He believed that learning was addictive, but only when people could experience discovery themselves. Thus the Exploratorium created a unique setting with a minimum of structure and intimidation, for people to explore science, art, and human perception, where learners become involved with their hands as well as their minds. Exhibits and explanations are designed to help visitors achieve the satisfaction of self-discovery. Frank wrote, “We do not want people to leave the museum with the implied feeling: ‘Isn't somebody else clever.’ Our exhibits are honest and simple so that no one feels he or she must be on guard against being fooled or misled.”

For the past twenty-five years, kids and adults, teachers and students, tourists and residents have been visiting the Exploratorium, located near the Golden Gate Bridge, in the only remaining buildings from the 1915 Panama-Pacific Exposition. It is a place where teachers come to learn and students can become teachers.

Slightly more that 625,000 people walk through the Exploratorium's doors each year. The museum contains a collection of 650 interactive permanent exhibits, space for temporary shows, clasrooms for training teachers, a 175-seat theater, library, and museum store. However, the Exploratorium's impact extends to millions of people each year through the dissemination of exhibits and programs to other museums and through its work with teachers.

The list of organizations in the US that have worked with or been influenced by the Exploratorium includes museums in thirty-two states and such places as the Imaginarium in Anchorage, Alaska, the US Space Foundation in Colorado Springs, Colorado, and the New York Hall of Science on Long Island, New York. Around the world, its impact is felt in thirty-three countries from Argentina to Japan, from the Republic of China to Wales. Closer at home, the Exploratorium has very active programs working with high school and K–8 teachers.

The current executive director, Dr. Goéry Delacôte, is working to both continue Frank's vision and extend it. “It is by doing something that visitors find answers to questions that they themselves have been led to ask,” Delacôte recently stated. “A problem is already half solved when it is put in the form of a question. This place should generate questions.”

He continued, “Since the Exploratorium's inception, the museum's exhibits and programs have focused on human perception: How do we see, hear, smell, feel, and otherwise experience the world around us? It is natural to expand that focus, going beyond perception to include cognition—in other words, using the mind to understand the very workings of the mind itself.”

Larry Shaw is the technical curator of the Exploratorium. As a staff member for twenty-one years, he enjoyed working closely with Frank Oppenheimer (who was the director from 1969 until his death in 1985), making Frank's vision real. Shaw continues to design and build exhibits, and work with teachers and artists. His latest projects involve computers, multimedia, and telecommunications, helping to take the Exploratorium into the next century. We recently met to explore the museum, its mission, what it does, and how interactive technologies fit into its future.

You are the Exploratorium's technical curator, what is that?

I have had that title for many years. When I started here, Frank [Oppenheimer] said, “You can put down anything you want except ‘director.’ ”

I have many hats. Basically, I am looking for technology that furthers the mission of the museum. My back-

Learning Through Experience

ground is physics, I've done AV and electronics for years. I have a few other hats as well. I've done some electronic music, some computer art. And I have had the pleasure of being support for the artist-in-residence program and the speaking-in-music program. I have received a very good arts education, informal arts education, by interacting with artists of various types over the years.

The position per se is one of trying to make sure that we can make use of technology for what we are doing. It also means making sure things get done, such as actually stringing the cable for an exhibit.

We don't have a very strong division of classes or hierarchies. For instance, elsewhere in building exhibits, the builder isn't always the designer of the exhibit per se. Here, we talk about the ideas of what we want, then somebody will say, "OK, I'll run with that." They go off, build a prototype. They show it to people and it gets modified. There is a continuous process of feedback. After building an exhibit, you get to repair it until the "design problems" are solved. The exhibit can be an albatross around your neck until any repairs are simply a part of the general maintenance. Even with our artist-in-residence program, the artists don't get the last 10% of their fee until their exhibit has been on the floor a month, with its [design] problems solved.

You have been here pretty much since its beginning?

Well, actually no. The beginning was in '69. In 1972 we got an NSF [National Science Foundation] grant, our first large NSF grant, and a lot of people were hired and I was one of them.

Interactivity and multimedia are popular terms these days as educational tools for helping people learn. The Exploratorium has been building interactive exhibits for twenty-five years. What has been your experience with presenting information interactively?

Presenting interactive information is what we are going towards.

What we have been doing is three-dimensional interactivity with the exhibits, and for kids it often includes big muscle activity; real things with real objects and with feedback. There is a kinesthetic sense for most of the things here. That has been the primary focus, working with that method for understanding.

To export this into some other media form is really difficult, partly because of the degree of interactivity that is needed—interactivity in the sense that when you do something it responds instantaneously. You should be thinking about *what* you are doing, not *how* you are doing it. The interactivity has to be very responsive, as if you are directly manipulating an object. I haven't seen this done very well in media things yet.

A couple of years ago, there was a paper in the journal of the ACM that showed that if the computer does not respond in about three-tenths of a second, it is in your way. So, even though you may have to do lots and lots of little things that you wouldn't really want to do, as long the computer's responding and you are doing the next thing in the chain, you will be engaged. It is this engagement that has to be encouraged. This is sort of the essence of what I've seen about responsiveness.

Looking into the future for a moment, given the fast rate of scientific and technological change, how is the Exploratorium changing in its use of computers and digital media?

The underlying thing for us is that we are involved in experiential learning; that you learn by experiencing things. It is easy to do the physical hands-on things. Experiential learning with multimedia objects, we are headed in that direction.

We have a proposal before the NSF for what we call the Learning Lab. It has several components. One is being able to take data from real exhibits on the floor and manipulate it in a more abstract manner. We will be connecting computers up to sensors on the exhibits, so that you can take real data and go home with a graph of what you actually observed or whatever the particular output is. This is one of the ways to increase learning. There are lots of exhibits that you can observe here, but you don't have a large amount of cognitive learning with them. The exhibits are strictly experiential.

The new framework that we are using includes cognition, understanding of what your experiences are. This includes media. We now have more mediated exhibits on the floor. We are working with a consortium of museums on a set of AIDS exhibits. One of these exhibits has a mechanical input device connected to a maze hooked up to a Mac. If you read all the labels and such, it allows you to see how the body's defenses work against the virus. It is interesting conceptually because as you try to manipulate the ball through the maze you are trying to get the person infected. You are doing this from the virus's viewpoint, not from the human's viewpoint.

Multimedia is both something people are learning about and a tool for teaching. Does this create any conflicts or problems when you are designing new exhibits?

Actually we are not teaching about multimedia, per se. We are a phenomena-based museum. We are interested in showcasing natural phenomena. It can be subtle things like perceptual cognitive phenomena, as well as physical, electrical, etc., standard physics phenomena. But we are phenomena based and multimedia is a way to extend the ranges of our understanding, having exhibits we couldn't normally have.

The Exploratorium has around 650 interactive exhibits showing and teaching about science and technology...

Well, it is not so much about technology. It is about science. It is science, art, and perception; based on perception and awareness. Technology keeps changing, the underlying principles are what we are interested in. We want people to say, "Oh yes, this is another example of this type of thing" or "Oh, it is obvious that they would have to do that"—having a technological answer show a particular phenomenon.

We are currently working on a set of exhibits on "feedback." While it is pretty abstract, everybody uses feedback almost all the time. When you are driving a car down the road, you are using mostly visual feedback. The Bots dots between lanes on the highways are tactile feedback that tell you that you are out of your lane. Everyone experiences feedback, we are looking at ways to make that more obvious—where feedback occurs and what the parameters of experience are.

We made a mechanical balancing stick which runs back and forth along a track. When it was first built, it was too good. It just sort of sat there. You touched it, the stick moved over a bit, and then would come right back. It was very boring. But by making the feedback system a little worse it would have trouble. What we hope to do on the final exhibit is allow you to play with how good the feedback is. That way people can see what makes a good feedback system.

Making it not work explains it better?

Right. But that's what people do. You do something until it breaks. Kids do that all the time. It is up to us to figure out how to make it bombproof *and* show what it does.

Years ago there was a demonstration I used for teaching to museum explainers. It showed that the shape of the wave going into a speaker, if you look at it on an oscilloscope, is the same way that a speaker moves. Basically, it was just an oscillator which you could adjust to run at some frequency, an oscilloscope showing the wave, and a speaker. You could watch the way a square wave jumps in and out or a sine wave has nice back and forth motion, or that a ramp has another motion. We tried to build an exhibit for the floor and make that bombproof. It ended up being the size of this [conference] table, with air bearings, an air pump, and a 200W amplifier. Everything encased. We went through this whole number and finally got it just about ready to go out on the floor. The director and I looked at each other and went,

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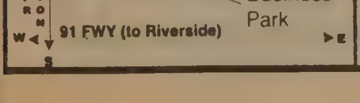

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Learning Through Experience

"No, it doesn't make it. This is a demonstration. It is not an exhibit." So it was scratched.

The floor, or exhibition hall, is how most people know the Exploratorium, but it is only part of what goes on here. Can you tell me a little about the Centers connected to the Exploratorium and the work you do with teachers?

The Center for Public Exhibition, which is the floor basically, holds the exhibits. There is the Center for Media and Communication, that's where I am now. And there is the Center for Teaching and Learning.

In the Center for Public Exhibition we have about as many exhibits as we can handle. Basically, they are a teaching collection for people teaching each other about phenomena; but they are also for our Center for Teaching and Learning, for the teachers to learn about phenomena. Even though it may not look like it from the layout, they actually are coherent groups of exhibits. We will concentrate on an area, then we and the teacher go out and teach with them. With teaching you want to be able to show the next logical step. If there isn't a next exhibit, we go, "Oh, we need an exhibit on this." A lot of exhibits which are not particularly interesting in themselves are really a key in the steps along the way. They try to be coherent in that sense.

Our teaching program has between 120–180 teachers per year come through on long, six-week courses. They use the exhibits, but also do hands-on experiments and learn how to make their own mini-experiments. We publish a *Cookbook* of the exhibits for other museums to copy what we do. The teachers, through the various things they come to understand while they are here, have made a *Snackbook*, which we also publish, showing a lot of the same principles of the larger exhibits here but that they can do in the classroom that are cheap and generally last only long enough for the demonstration.

Where are these teachers from and what grade levels?

They are almost all local, the Bay Area, and mostly high school teachers. This program is called the Teacher Institute and gives continuing education credits. Generally, it is done in the summer when they have time. The National Science Foundation pays for their stipend.

We have another program called SITE, School in the Exploratorium, for K–8. Originally, it had classes meeting here. Now, mostly it is developing teachers in the K–8 level, mostly in Marin and San Francisco—San Francisco because of the proximity, teachers can participate after school, and Marin because there was money. The Marin Community Foundation has been a big supporter and SITE has touched most of the teachers in Marin.

A lot of the teachers in K–8 are not science teachers. A lot of what we have done in that program has been to enhance their confidence. That's a basic thing. The program includes an adjunct artist as a member of the team working with the teachers. This presents both an academic scientific understanding and a practical way of using the knowledge. The teachers are also learning the "discovery method"—they learn that they will continuously discover new things with their kids because each class is different.

Teachers learn about science, but learning about exploration is also key.

Exploration particularly. It is about process. You learn most when you are excited about what you are doing, when you are discovering it yourself, rather than being a passive container for the knowledge. It is all based on discovery, experiential learning.

That gets us back to issues of media and how you export experience. It's very difficult. But there is a large coalition of people working with multimedia in the Bay Area that is slowly beginning to solve this question. Everybody is inventing the concepts and the understandings of what it takes to make multimedia really work. Speed is one component, but there are also interface issues of how metaphors facilitate people's explorations.

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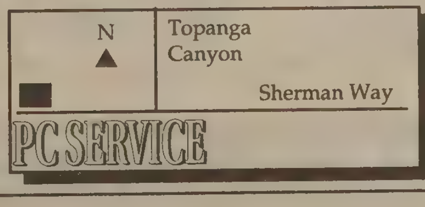

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Learning Through Experience

The various types of media clearly have their limitations. I really like Brøderbund's multimedia piece called Grandma and Me. Recognizing the limits caused by the data rate coming off the CD-ROM, they have still been able to do things that look totally natural. On the opening story page, there is a bus that comes across the screen. As it gets closer, and thus larger, they made it go off the screen. If they didn't, the image would have had too many pixels to keep the motion smooth. It's a really nice hack on their part. They pushed the medium to its limits and yet it did not interfere with the story.

Media is interesting. I sponsor an artists and technology organization called Ylem that meets here every other month. Late one night after people had presented a whole bunch of things, this one artist said, "Let me just show you this tape that I made called *The Burning Man.*" It was shot out in the desert near Pyramid Lake, on an old Fisher-Price camcorder that records on audio tape, and everyone was fascinated. It is black and white, sixteen levels of gray, 160 x 120 resolution. After three hours at a meeting people are usually leaving, but they stayed to watch this. The [quality of the] tape wasn't that good, but because it was so poor you spent a lot of your time involved in it trying to guess what was going on. You had a very heavy perceptual involvement in completion—what am I seeing, what am I looking at—plus it was sort of magical in its own sense. Those two things worked together. I was amazed to see that involvement by people in a very "technically poor" medium. It has to do partly with content, but also in using the problems of the medium to its best advantage for getting people involved in how to see this tape.

When people in one medium are trying to copy other media they aren't making use of their own strengths and weaknesses. It takes invention on the part of the creators to really make use of those media. This is being done, but only incrementally. People are stealing ideas from each other, which is just fine as far as we're concerned. It's different when you are in the competitive world. But I think that change has gone much faster because people are stealing from each other. The other guy says, "Well he did that with my stuff, I can now do this with it." And you are off to the next level of creation.

What sort of partnerships have been formed with technology companies in the area?

We are relatively new in this area. The first major thing that we were involved in was last year with Apple Computer and Kristina Hooper Woolsey as their Multimedia Lab was being dissolved. Apple had decided it had done its work when the Lab had begun making products. It had done the research of inventing tools and ways of looking at things.

One of the projects we did was with a fourth-grade class at Ross. It was there more out of convenience than anything else. The son of one of the Apple persons was in that school. Apple had been working with them and there were already computers there. Apple had this prototype multimedia software where kids would make little QuickTime movies asking questions. They would send them to us. To answer, we could annotate their movies with these tiny talking heads or with another QuickTime movie of some phenomena, or saying "here is something you can do," or "yes, that is a good question, but did you think about this?" So there were these conversations that went back and forth.

It was asynchronous; we couldn't get the telecommunications in place because it was too expensive for the budget and just time-wise. (Marin is sort of out in the boondocks in terms of telecommunications. As far as I know there are no plans for ISDN from PacBell for Marin; you can get switch-56, but you can't get ISDN.) With the asynchronicity it would be two or three days before the students got an answer to their question. But that didn't matter because they had recorded the question. They could see their question and then they would see the answer. They would recontextualize the answer very easily. It wasn't just coming out of the ozone.

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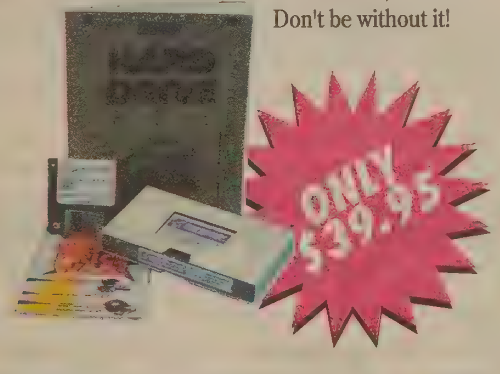

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You should be thinking about *what* you are doing, not *how* you are doing it. The interactivity has to be very responsive, as if you are directly manipulating an object. I haven't seen this done very well in media things yet.

We did that last spring. This next spring we hope to expand it to two or maybe four schools, and do it via telecommunications. We are in the process of setting that up right now. It will probably be on weather because we're experts and already have materials available.

This also leads us to one of the network projects we are doing. The hypermedia of the World Wide Web seems to be a way of working with a lot of material. While the Web browsers like Mosaic are not the perfect hypertext or hypermedia systems, they exist. We are trying to look at exploiting that as one of our next steps.

Although not as well know as some of the other resources (such as ftp, gopher, or WAIS) that users work with on the Internet, World Wide Web is quickly becoming very popular among people at institutions that enjoy a strong, fast connection to the Internet. Could you explain the Web a little more?

CERN, the Center for European Nuclear Research in Switzerland, developed a hypermedia server. They developed it so that they could make hypertext connections between physics papers they were publishing. It was a way of indexing subject matter and section—essentially when you have a footnote you could go directly to the paper that is referred to in the footnote because it is hypertext.

That was their reason to invent this hypertext server. They give away the software. The National Center for Superconducting Applications at the University of Illinois at Champaign-Urbana has been working on making browsers, client browsers that can browse this type of server. Browsers called Mosaic exist for both the Mac and the PC, there is also one for X-Windows systems and UNIX Sun workstations. It is disbributed free via ftp on the Internet.

What is the Exploratorium doing, what sort of resources are you making available to people via the Internet?

Currently we have an ftp server, a gopher server, and now a Web server. Right now they are mostly about general organization—things like hours, memberships, etc. But because the Web is hypertext we can put QuickTime movies, sounds, and such. We could also have experiments, demos, and examples of the phenomena.

We publish a magazine which is generally on a single topic, such as dirt or nothing (which is on vacuum) or toys. They are done both for entertainment and teacher resources. We want to put back issues, the ones that are out of print, on our Web server, so that there are pictures there. We had a sound magazine that had a little record in it, that eventually will go on there. Since we have to generate income there is always an income problem around all this. But there is also a problem of copyrights. We don't have the electronic rights to these things. We didn't think about it when we contracted with the authors. The way the law works, that unless the author specifically gives up the right, they retain the electronic rights or any other rights, except for the serial publication rights that they have given us.

Where is Ted Nelson now that we need him? Remember Project Xanadu? Built into that system was to be the counterflow of money for the information. It looks like its time is almost here. The need is there and it would solve a lot of electronic rights problems for a lot of people, at least network problems.

Is there a vision of having part of the museum online?

Yes, definitely. Online and as interactive as possible. In the issue of the magazine on weather there were examples of various weather phenomena. One of the things you can do with hypertext on the Web is give the current weather picture. You click and it gives you what the weather is today. And it always shows today because it goes and gets the picture from the University of Michigan.

There is a publicly accessible part of the vision. But we are really bent on supporting teachers and science learning. There is an idea called Exploranet, which would be a connection to us and our resources. Building a community of teachers, continuing to support teachers that have come through the museum, helping teachers support each other, is all made easier through electronic communications.

During February one of the special programs at the Exploratorium is the Multimedia Playground: Roadside Attractions on the Information Highway for Kids and Adults. What will this include?

The easiest things to do are showcases for multimedia software. Letting people play with a range of things. We are a family-oriented museum and our greatest usage is on the weekends. People tend to teach each other. That works very well. In fact that is one of the criteria for exhibits, particularly media interactive exhibits. What is going on has to be obvious to people standing behind the operator. There are lots of interactions that can be quite satisfying to the person doing them, but are totally inobvious to onlookers.

We've got commitments to showcase quite a bit of software—generally standard CD-ROM-based software. We are also interested in the telecommunication and network aspects. We will have servers up showing the World Wide Web, gopher, and such. And having demonstrations and people talking about each one of those things.

Hopefully, we will have a virtual reality exhibit. We may do some long distance, interactive things. There is a widely distributed piece of software that allows people to interact over a modem in the same visual space on the screen.

Will there be terminals for people to sit down at and explore the Internet themselves?

Yes. We will have fetch, the World Wide Web, and the Knowledge Network up, which is PacBell's gopher that allows people to work with a variety of academically oriented references and projects. We hope to introduce people to that through talks and by hands-on.

Hands-on is a real problem. The Web is the most accessible because it is visually available. The problem is that if a person spends fifteen minutes at the computer, you get four persons per hour. If we are open seven hours, that means twenty-eight people each day. This is one of the reasons you want to have as many terminals as you can.

Given what you said about experiential-based learning, how do things like the Multimedia Playground and the exhibits on Black History Month fit in?

Black History Month has been "celebrated" here for several years and is an attempt to broaden our own and the public's perspective and to become more attractive to a wider audience. We are aware that we are a white, middle class institution and are making attempts to broaden ourselves. We have a multicultural coordinator but I think we really aren't very creative in this area. (Science tends to be something of white cultural interest; a historical and economic bias but, I think, changeable.)

As far as the fair goes, it's partly an extension of our own work in multimedia and networking plus it's hot so our "marketing" department saw an opportunity for more attendance. We have a history of showing interesting technology

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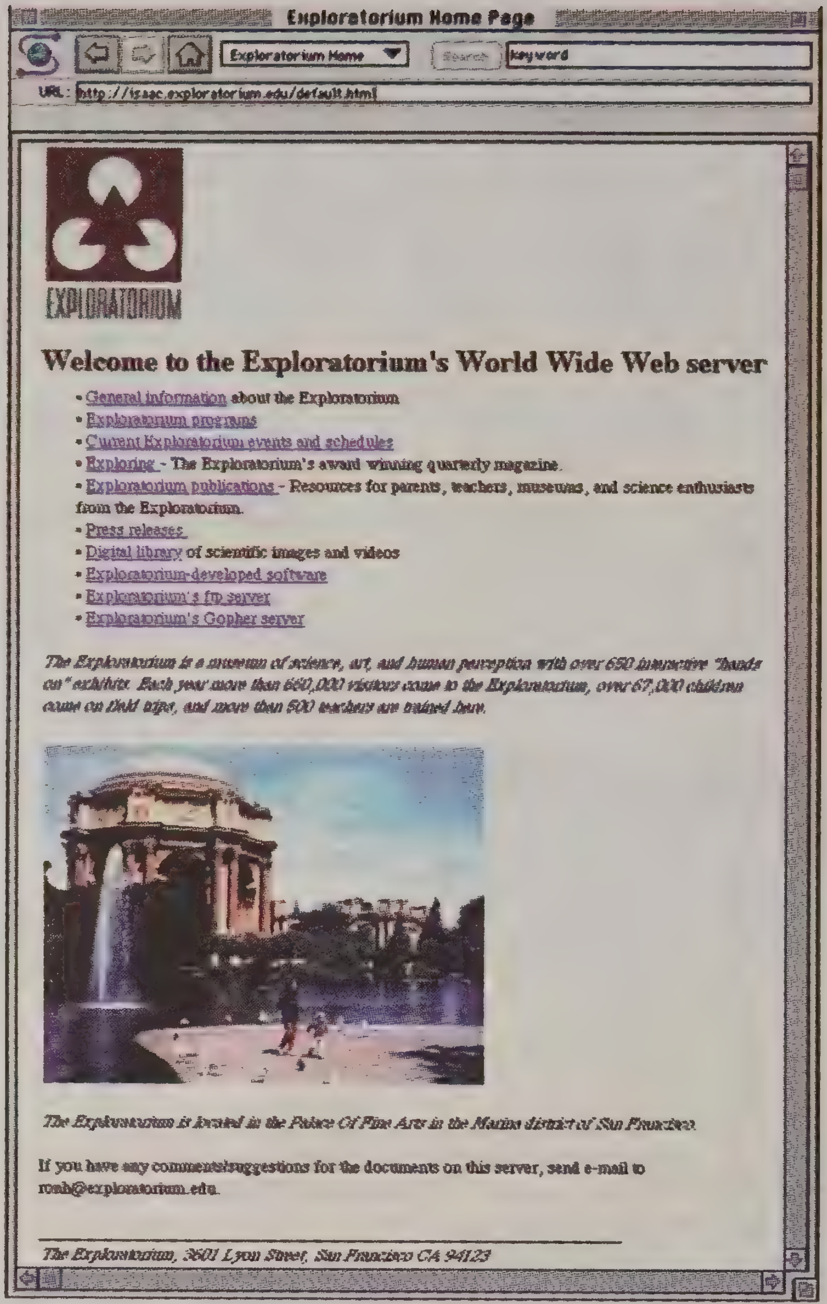
from time to time. We did a very successful show on medical technology where we had equipment plus medical professionals to demonstrate and, most importantly, answer questions.

There is a quote by Dr. Frank Oppenheimer that "art is included, not just to make things pretty, although it often does so, but primarily because artists make different kinds of discoveries about nature than do physicists or biologists.... Both art and science are needed to fully understand nature and its effects on people." One of the ways artists have been included here is through the artist-in-residence program. How are artists involved in the Exploratorium and what sort of projects have they done?

Our support is for artists trying to do something that is mutually of interest and generally trying to push their repertoire of things to do. Because we have technical resources we can help them learn things that they haven't been able to do, haven't had the resources to do.

It can be of mutual interest because art can show all sorts of phenomena that are otherwise hard to explain. We can have art here and a teacher can say, "This piece shows this phenomenon and this phenomenon, and the interactions between them." But you do not have to be specific about didactically teasing out exactly what's going on.



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Welcome to the Exploratorium's World Wide Web server

- General information about the Exploratorium
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- Current Exploratorium events and schedules
- Exploring - The Exploratorium's award winning quarterly magazine.
- Exploratorium publications - Resources for parents, teachers, museums, and science enthusiasts from the Exploratorium.
- Press releases
- Digital library of scientific images and videos
- Exploratorium-developed software
- Exploratorium's ftp server
- Exploratorium's Gopher server

The Exploratorium is a museum of science, art, and human perception with over 650 interactive "hands on" exhibits. Each year more than 660,000 visitors come to the Exploratorium, over 67,000 children come on field trips, and more than 500 teachers are trained here.

The Exploratorium is located in the Palace Of Fine Arts in the Marina district of San Francisco.

If you have any comments/suggestions for the documents on this server, send e-mail to robh@exploratorium.edu.

The Exploratorium, 3601 Lyon Street, San Francisco CA 94123

The Information Highway, and Wide World Web, will let more people learn about the Exploratorium and "visit" the museum from their school. office, or home.

We have a piece called *AM Lightning* with RF gas discharge, which has little blobs of plasma moving back and forth in it. Why they do that is very sophisticated, and I am not even sure that it is fully known. But it is a nice thing to play with. So it's a piece of art. The person who did it is Bill Parker, a plasma artist, but his background is in physics and he consults on free-electron lasers and various things like that. But his primary interest is finding and displaying interesting phenomena for people to play with.

The strength of the artist-in-residence program, besides the particular interchange between us and the artist, is that it produces artifacts that are interesting and have some depth. One of the criteria for real art is that it is something you can keep coming back to, finding new things in it. Since we tend to be phenomenological, the art is not images of human beings doing things, but images of nature doing things. That is our particular bent. But because it is an art piece we don't have to explain it, and sometimes they are not explainable, per se. Not having to explain it gives us a freedom to show very complicated things.

The *Sun Painting,* by Bob Miller, was one of our earliest artist-in-residence pieces. That artist was actually on staff as associate director for many years. One of the things his exhibit shows is that we are not just covered with light, we are covered with images of things. They are overlapping images so they smear each other out and it looks like it is just light falling on us. What is falling on you tells you where the light is coming from, there is lots of information in this. He uses light in various relatively simple ways, but always does very nice things.

The Museum is twenty-five years old this year. We already talked a little about the nets, what else is in store for the next twenty-five years?

There is a publishing component that we are working on—there may be CD-ROMs in our future. Partly because you cannot shove everything over the networks.

Physically, there would hopefully be some expansion into the Presidio which will help make more space for exhibits. We are maxed out at the number of people we can get through this space. On the weekends you can only get about four or five thousand per day through this building.

We have hopes of becoming a national teachers' center, offering a degree for training teachers, helping in the reform movement in the teaching profession. While experiential learning, project-based learning, have been given lip-service in the educational establishment, these ideas have really galvanized teachers. And this is one of our major focuses. Going beyond just the phenomenological and the perceptual into the realms of cognitive learning opens up a lot of directions to be explored.

The networks look like an important way to go. It just depends on how the technology evolves, and what we can do with them. The hypermedia of the Web is a good beginning. There are many things that still need to be invented so people can surf the net and get to where they want to go. You should be able to experience it without the technology getting in the way.

Interactivity is the basis of experiential learning. You have to have interactivity at a relatively high rate. On television these days, in advertising you get a mini-story in fifteen seconds. Kids can take in data at that rate. It is based on common, human-level experiences that everybody is familiar with. So it can go faster than things that are less common. We have developed a visual language through television that allows things to happen relatively rapidly.

Teachers talk about "kids can't concentrate," not being able to stay on one thing. But if they are really engaged, and they are going in the direction of what they want to do, there is no attention problem. It is just when they can't go forward they go sideways. The attention is not going to stop because there is a barrier there. The interruption of not being able to figure something out is frustrating. For the most part that is what happens to kids in school. But if kids can keep asking questions and keep getting answers, and do it experientially, they will continue. You want to say, "You have this question, the answer to that is," "Why don't you put together this little experiment, that is the next step in the answer." Since it is doing something, the kids really like to do things...it is an active process.

You need to have interactivity and connectivity that is rich enough to support the various pathways. We have some excellent teachers who teach the teachers. They have really good raps as they interact with people while they are teaching the exhibits. Their raps on how you think about the particular phenomena are very good. We would like to make this available via the different media, and indexed in such a way that you can come into this discussion where you want; where they are talking about polarization and here is an example and you can do this and you can do that.

For teachers, suppose you have not taught polarization for three or four years and tomorrow you've got to teach polarization. Here is somebody with a coherent rap. Well, suppose you are a kid wanting to learn about polarization, here is a coherent rap. And it is essentially available on demand, this is part of what makes the networks alive. It is a tool for discovery, and self-discovery is really the core of it. You have to discover it for yourself. ■

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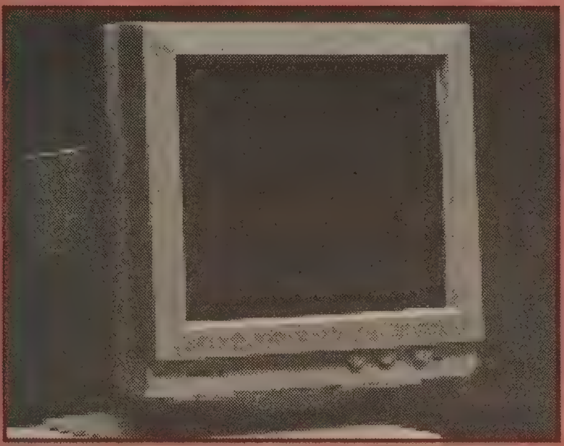

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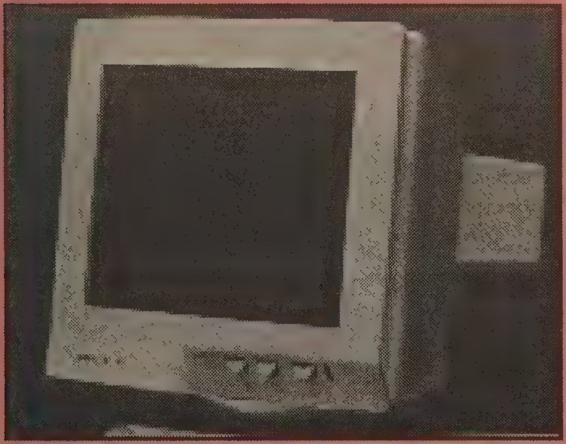

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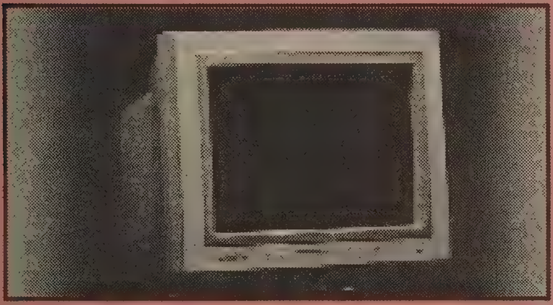

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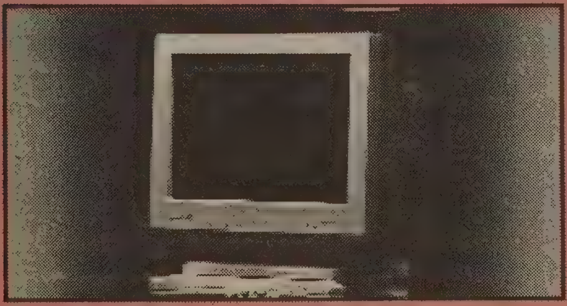

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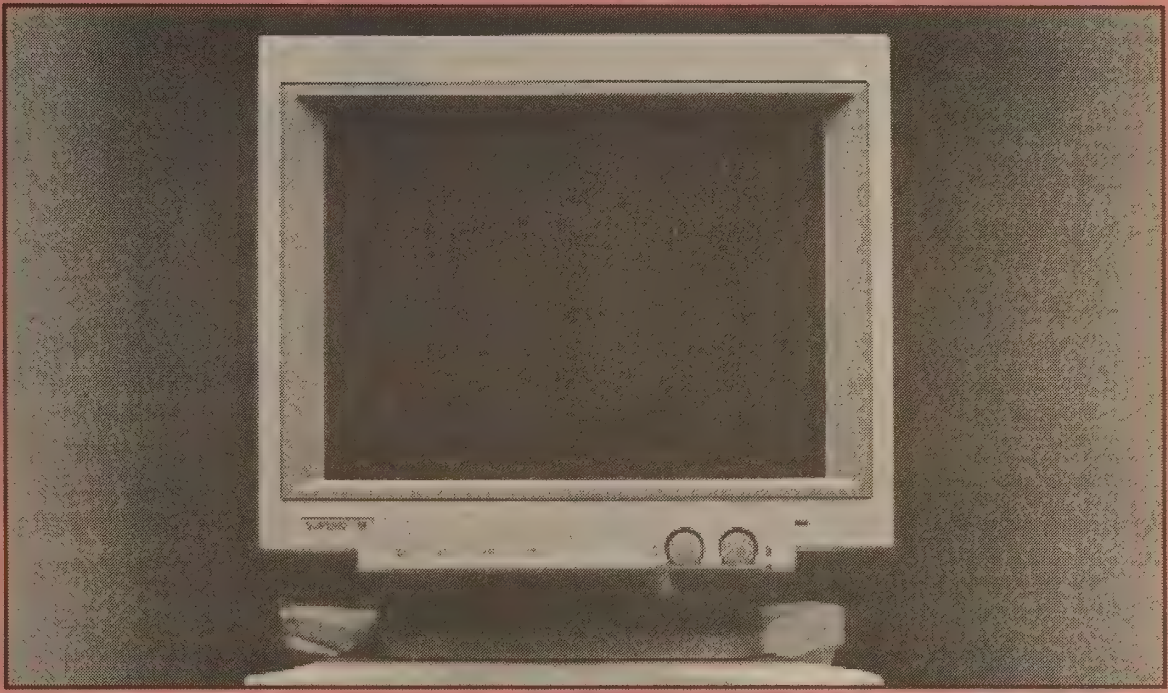

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Continued on page 86

Errata

In the December 14 issue of *MicroTimes*, the price of the Sharp LC-10V1 monitor was incorrectly listed as $798. The correct price of the monitor, which is currently available only in Japan and has no exact price in US dollars, is approximately $7300. For more information, call: 1-800-BESHARP (237-4277).

UPDATES

✤ **Alaris** decreased the price of its Leopard motherboard products. The **Leopard 486 SLC2/66** now costs $299, the **486 SLC2/50** $249, and the **486 SLC2/50 LX** $199. Alaris, Inc., 46704 Fremont Blvd., Fremont, CA 94538. (510)770-5700.

✤ **Aldus Corp.** announced **PhotoStyler 2.0**, an upgrade to its Microsoft Windows-based color digital imaging application. Users of the prior version can upgrade for $150. Aldus Corp., 411 First Ave. S., Seattle, WA 98104-2871. (206)622-5500.

✤ **Aldus Corp.** announced **Freehand 4.0** for the Macintosh. Users of prior versions can upgrade for $150. Aldus Corp., 411 First Ave. S., Seattle, WA 98104-2871. (206)622-5500.

✤ **ExperVision** announced **TypeReader Professional**, a new optical character recognition software, which retails for $695. ExperVision, Inc., 3590 N. First St., San Jose, CA 95124. (408)428-0823.

✤ **FWB** announced that owners of PLI's QuickSCSI or MicroNet's NuPort cards can **upgrade** to **SCSI JackHammer** for $499. FWB, Inc., 2040 Polk St., Ste. 215, San Francisco, CA 94109. (415)474-8055.

✤ **Lotus** released **Lotus Notes: Document Imaging (LN:DI) 2.** Lotus Development Corp., 55 Cambridge Pkwy., MA 02142. (617)577-8500.

✤ **Microsoft** shipped **Microsoft Works 3.0 for Windows.** Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6399. (206)882-8080.

✤ **Microsoft** announced **Microsoft Money 3.0.** A special retail price of $34.95 is effective until April 15, 1994. Users of v2.0 may upgrade for $15. Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6399. (206)882-8080.

✤ **PC Express** released **TwinBridge Chinese3 System 3.2.** PC Express, 820 Garfield Ave., Ste. 201, Alhambra, CA 01801. (818)293-1661.

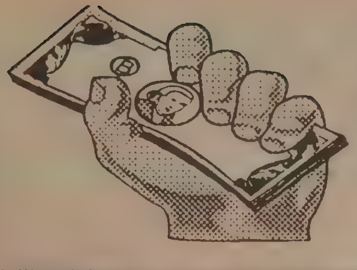
✤ **Shiva** released **NetModem/E 1.5:** Netmodem/E owners can upgrade for $75. Shiva LocalTalk solutions users can trade up for $1099. Shiva, 63 Third Ave., Burlington, MA 01803. 1-800-458-3550.

✤ **Supra** is offering **Supra Voice Processing.** The voice option upgrade is available to owners of high-speed SupraFAXModems for $99.95. Supra Corp., 7101 Supra Dr. SW, Albany, OR 97321. (503)967-2400.

✤ **The TravelData Company** released **PC Travel 3.2**, which includes these new destinations: Santa Fe, Phoenix, Baltimore, St. Louis, and Kansas City. The TravelData Co., 1211 Coast Village Rd., Ste. 4, Santa Barbara, CA 93108. 1-800-635-9777.

✤ **VisiSoft** shipped **VisiNet 2.5**, a network and systems management software. Visual Software, 2700 NE Expwy., Ste. B-700. Atlanta, GA 30345. (404)320-0077.

✤ **Wacom** released **Windows Driver for Windows 2.0.** Compatible with all Wacom Serial Tablets, the upgrade is free for owners of SD series tablets purchased after January 1993. Wacom Technology Corp., 501 SE Columbia Shores Blvd., #300, Vancouver, WA 98661. 1-800-922-6613.



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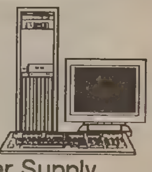

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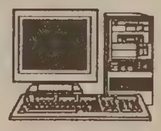

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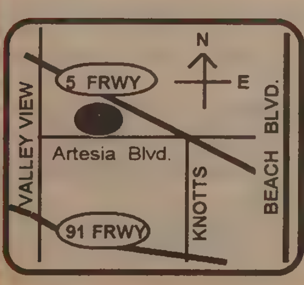

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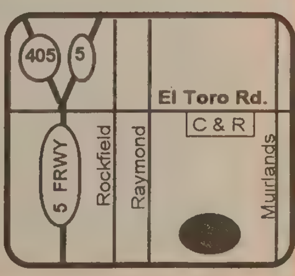

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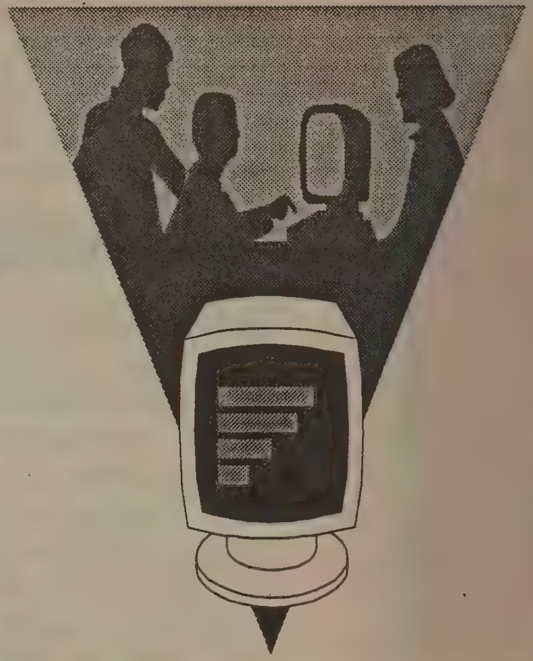

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- Mini-Tower Case
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Local Bus

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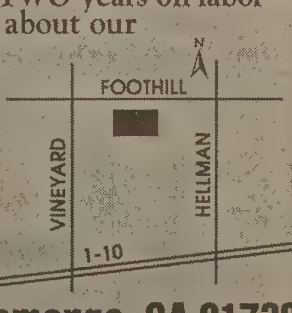

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Continued from page 80

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FlexStor offers a distributed Hierarchical Storage Management (HMS) software solution for Sun OS- and Solaris 2.x-based workstations and servers, and operates under both the Open Look and Motif GUI. FlexStor minimizes the cost of managing and storing information by automatically and transparently migrating data files to the most cost-effective medium based on user-definable criteria. Once installed, no further administration is required. The software supports transparent migration between online disks, near-line optical disks or tape libraries, and off-line tape libraries, and dynamically optimizes online disks for maximum performance. In addition to client level file migration, server migration is also supported. (Prices start under $4000 and vary depending on the type of library storage device and number of migration clients in the network) Introl Corp., 2817 Anthony Ln. S., Minneapolis, MN 55418-3254. (612)788-9391.

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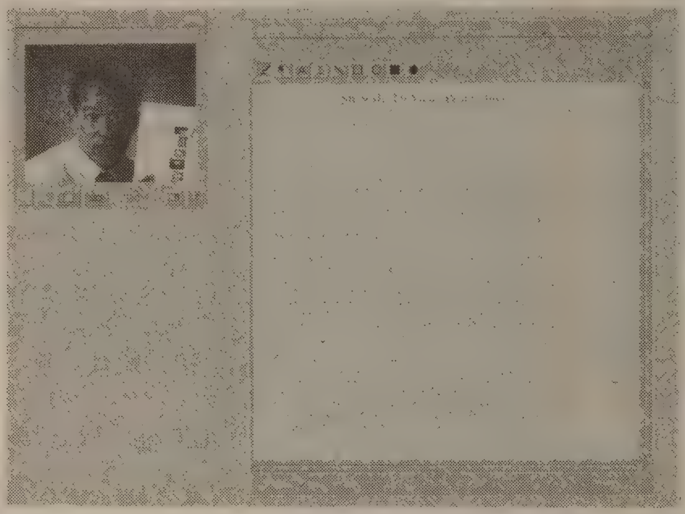

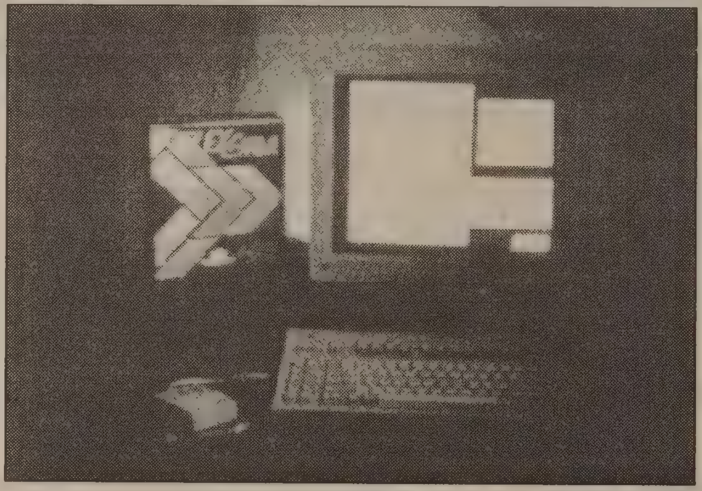

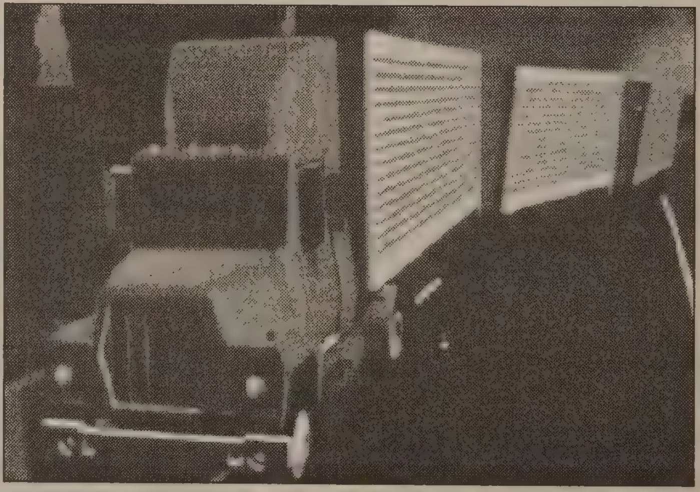

Top to bottom: ShowMe 2.0 from Sunsolutions; Introl FlexStor for Sun; VisLab for Silicon Graphics.

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Tecplot v6.0 is a versatile data visualization and technical plotting software package for scientists and engineers. It is interactive, doesn't require programming, and allows easy creation of XY, 2-D, and 3-D surface plots. An optional extension called 3DV is also offered with Tecplot that adds the capability to visualize volumetric data as iso-surfaces, 3-D streams, selected IJK-planes, point clunds, and arbitrary data slices. Tecplot doesn't impose rectangular structure to data points. It allows visualization of data in whatever mesh structures exist including: rectangular, curvilinear, non-othogonal, triangular, quadrilateral, tetrahedral, 8-node finite-element brick, and even randomly positioned data points. In its multiwindow environment up to sixty-four plots can be created simultaneously and superimposed or placed side by side. TelePort is available for IBM compatible PCs running DOS, most UNIX workstations, and DEC VAX stations running VMS. ($694 for the PC and $1695 for workstations) Amtec Engineering, Inc., PO Box 3633, Bellevue, WA 98009-3633. 1-800-676-7568.

EXECUTIVE FILE ALERT

File Alert is an automatic file corruption detection product for Windows NT running on the Digital Alpha AXP PC platform as well as for Intel-based PC and MIPS PCs. The software provides the advantage of instant notification at the first sign of corruption, allowing the operator to find problems early before they cause further damage. It also creates and maintains a journal of any corrupted files detected, including a log of deleted files. Making use of the Windows NT priority settings, the user can assign File Alert a run priority. When run in idle mode, File Alert automatically reduces its use of system resources during peak load times. (Introductory price is $99 for each hard disk to be canned) Executive Software, Inc., 701 N. Brand Blvd., 6th Fl., PO Box 29077, Glendale, CA 91209-9077. 1-800-824-4357.

Continued on page 93

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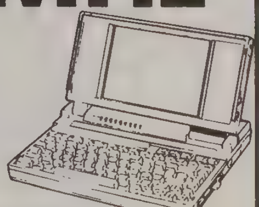
486SL-25MHz



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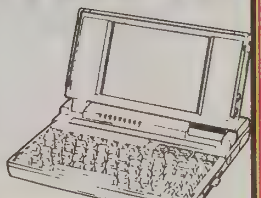

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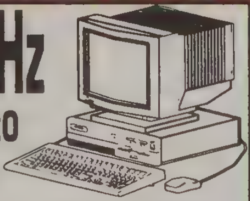

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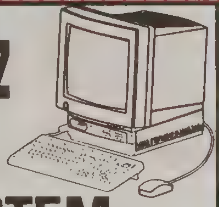

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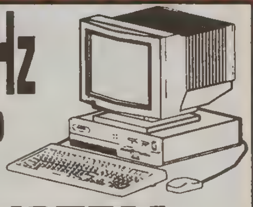

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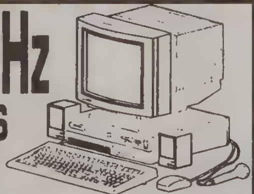

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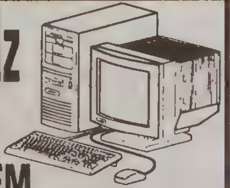

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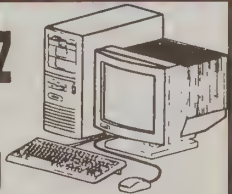

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5 drive bays • Intergrated fax/modem Suports Intel OverDrive processor(486DX2/66), as well as future OverDrive processor with Pentium technology • **Preinstalled software:** MS DOS • TabWorks • MS Windows Workgroups • COMPAC Mouse
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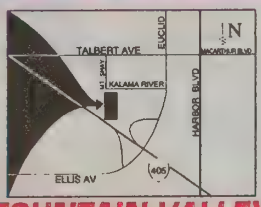

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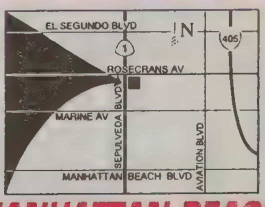

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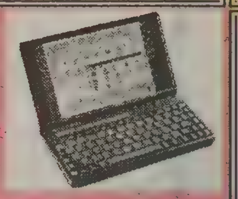

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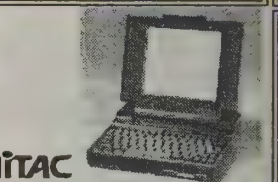

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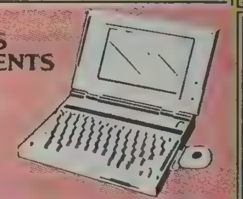

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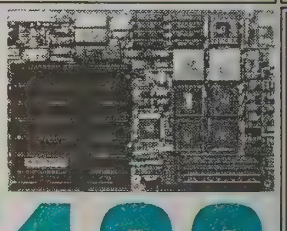

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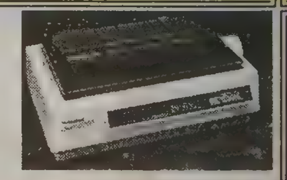

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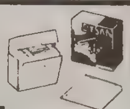

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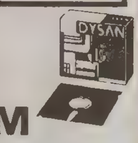

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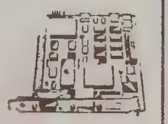

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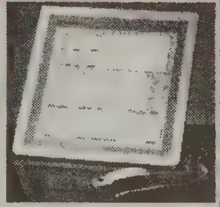

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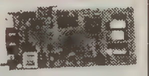

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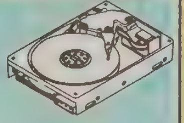

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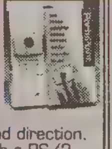

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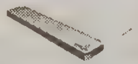

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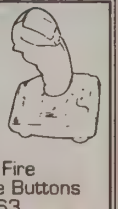

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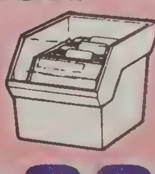

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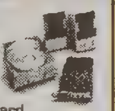

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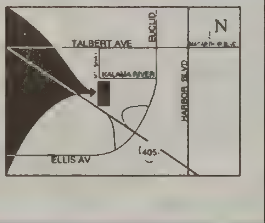

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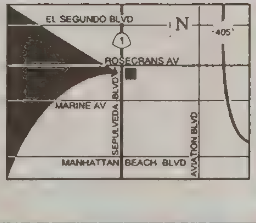

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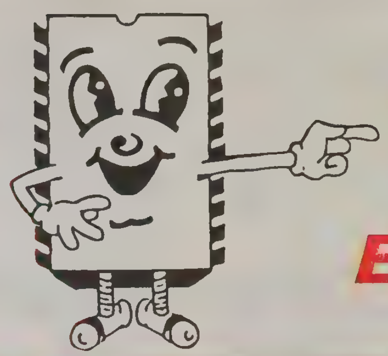

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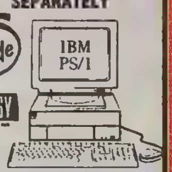

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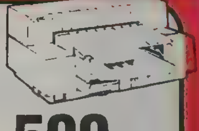

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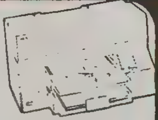

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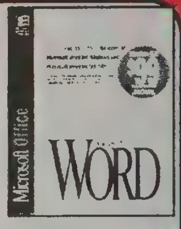

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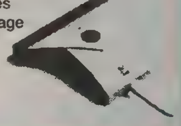

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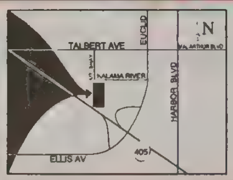

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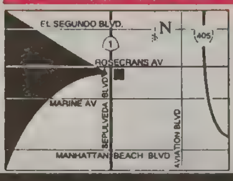

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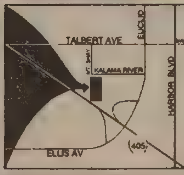

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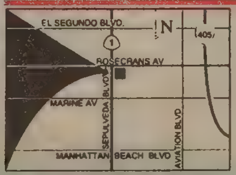

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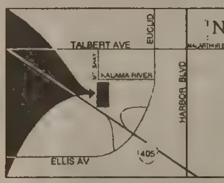

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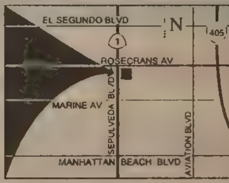

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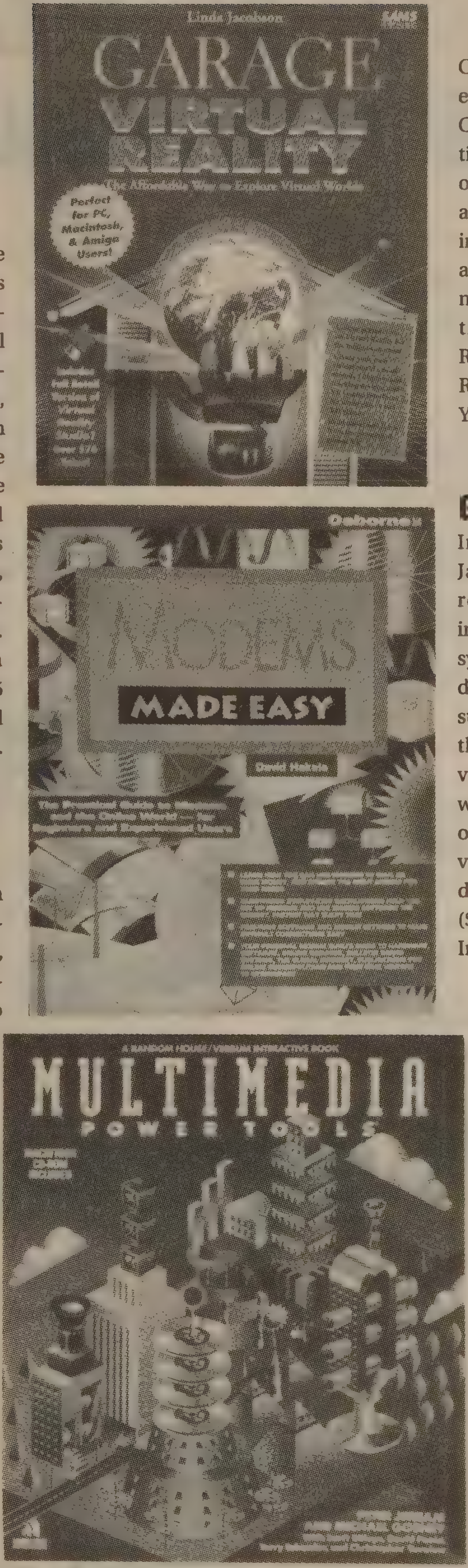
SHANY ALERTVIEW 2.0

AlertView is a network management program designed to troubleshoot applications running on networked PCs. The new version, which functions in both LAN and WAN environments, allows network administrators to manage multiple protocols from a single management console. AlertView's functionality now extends to provide improved remote access, support for Novell's NDMS and Desktop SNMP, and compatibility with all major network management platforms. Additional new features include TCP/IP protocol support to provide compatibility with the most popular internetworking standards today, statistical views to provide improved reporting of application events, SuperVGA support, user interface enhancements, and a fully indexed, comprehensive manual. ($935 for ten concurrent users) Shany, Inc., 1101 San Antonio Rd., Mountain View, CA 94043. (415)964-7410.

Books

MULTIMEDIA POWER TOOLS

Created by multimedia experts Michael Gosney and Peter Jerram, *Multimedia Power Tools* lays bare the technology and techniques behind multimedia, so readers can make informed decisions and development strategies. The book/CD-ROM package features a system called Power Codes; when the book mentions an application, technique, or utility, it often provides a Command-key code which allows the reader to jump directly to the related files on the CD-ROM. The book includes hundreds of tips and tricks from top multimedia developers, an extensive multimedia glossary, and information on such topics as authoring tools and techniques; producing sound, animation, video, and interactivity; file formats, compression, and storage considerations; and the US copyright act. ($50) Random House Electronic Publishing, Random House, Inc., 201 E. 50th St., New York, NY 10022. 1-800-733-3000.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MULTIMEDIA POWER TOOLS

Top to bottom: *Garage Virtual Reality* by Linda Jacobson; *Modems Made Easy* by David Hakala; *Multimedia Power Tools* by Peter Jerram and Michael Gosney.

GARAGE VIRTUAL REALITY

In *Garage Virtual Reality*, author Linda Jacobson shows how to create a virtual reality system for multiple platforms, including IBM PCs, Macintosh, and Amiga systems. The book presents the origins and definitions, introduces the people who first started exploring garage virtual reality, and then explains what's required to explore virtual worlds yourself. The disk included with the book contains a full retail version of Virtual Reality Studio 1, special demo version of Vistapro 3, source code for developing virtual interfaces, and more. ($24.95) Sams Publishing, 201 W. 103rd St., Indianapolis, IN 46290. 1-800-428-5331.

WORDPERFECT 6.0 FOR DOS INSIDER

WordPerfect 6.0 for DOS Insider, by Peter Aitken, is written to make the intermediate WordPerfect user a power-user by revealing the undocumented short cuts and secrets of this popular word processing program. It explains how to design and write time-saving macros as well as explaining changes in macro language from earlier versions of WordPerfect. Key topics include: printing labels with nonstandard dimensions, reproducing low-resolution graphics in a document, previewing before printing a document, creating a macro that prints a file to disk, and creating tables and using graphics for desktop publishing. ($26.95) John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158. 1-800-263-1599.

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Advertising From the Desktop: The Desktop Publishers Guide to Designing Ads That Work, by Elaine Floyd and Lee Wilson pre-

Continued on page 98

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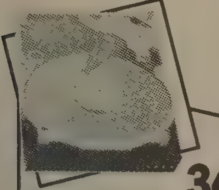

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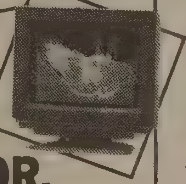

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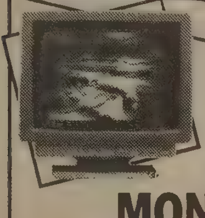

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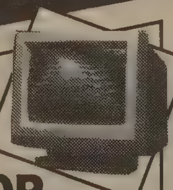

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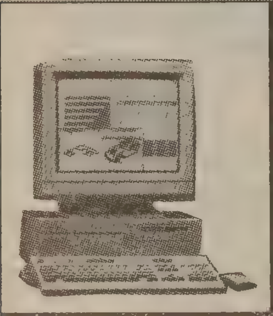

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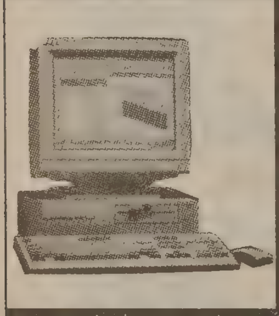

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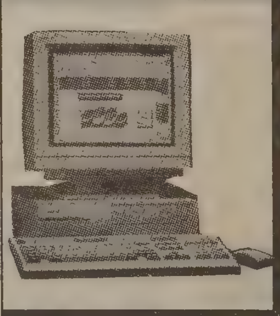

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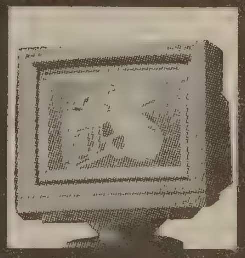

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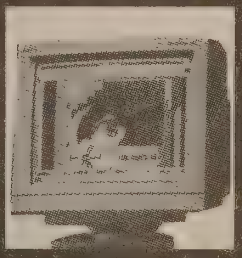

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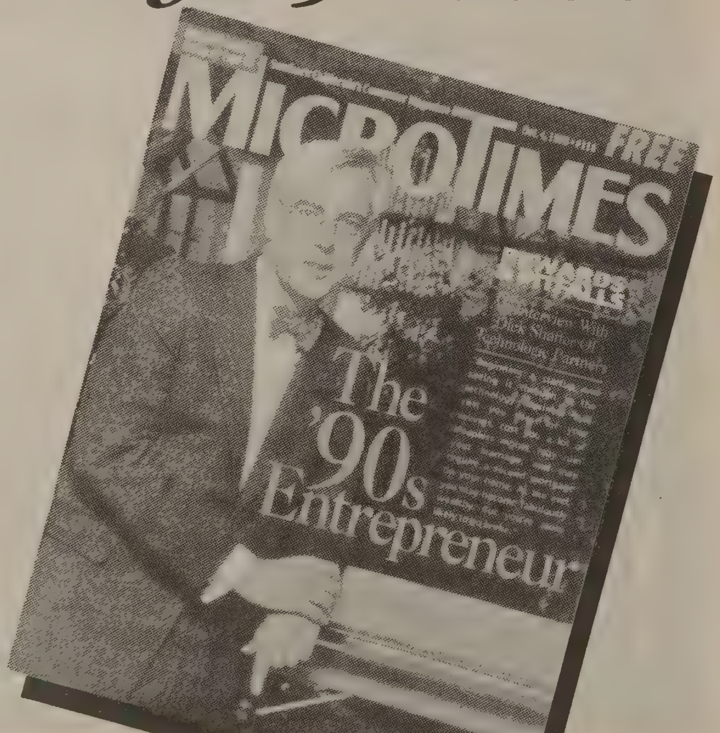

Continued from page 93

sents a compendium of marketing and design advice especially for desktop publishers new to the art of visual persuasion. Using time-tested advertising techniques and hundreds of illustrations, Floyd and Wilson offer advice on how to increase the power and performance of ads with a solid marketing play; when to use—and when not to use—special effects; create layouts that command attention; and make headlines and logos hit the mark. ($24.95) Ventana Press, PO Box 2468, Chapel Hill, NC 27515. 1-800-743-5369.

MODEMS MADE EASY

In *Modems Made Easy*, author David Hakala gives suggestions and ideas for everything from puchasing hardware and software to accessing online services, the Internet, and cyberspace. This book provides illustrated step-by-step instructions for easy, trouble-free modem connections. Information on using Windows, fax/data modems, and optical character recognition (OCR) software is also included. For those who become enthusiasts, Hakala describes easy-to-operate BBS software so readers can set up their own bulletin board system. Other topics covered include: buying the right modem at the right price; fine-tuning and troubleshooting your modem and fax board; sending email through the major online services such as CompuServe, GEnie, and America Online; and communicating with the White House. ($16.95) Osborne/McGraw-Hill, 2600 Tenth St., Berkeley, CA 94710. 1-800-227-0900.

INTERNET BASICS

Internet Basics, by Walt Howe and Steve Lambert, takes readers on a simple guided tour of the Internet. Beginning with precise instructions on how to access the Internet, the authors provide a complete and concise introduction to life in cyberspace on the global electronic information highway. Topics include how to obtain free Internet access; send email; exchange information through Listserv and Usenet; transfer files with FTP; communicate with proper network etiquette; and use Internet resources such as Telnet, archie, gopher, WAIS, veronica, and others. *Internet Basics* includes free membership to Delphi Internet Services and five hours of free online time. It also provides answers to frequently asked questions, as well as country codes and appendices on UNIX basics, and Internet and Delphi commands. ($27) Random House Electronic Publishing, Random House, Inc., 201 E. 50th St., New York, NY 10022. 1-800-733-3000.

THE INTERNET NAVIGATOR

The Internet Navigator: The Essential Guide to Network Exploration for the Individual Dial-Up User, by Paul Gilster with a forward by Vinton Cerf, one of the "founding fathers" of the network, is written to help chart out the fastest, most streamlined path for those who want to take advantage of the Internet's resources. It provides Internet novices with a broad overview of the system, explaining what it is, how and why it was created, and what the future of the Internet looks like from here. Gilster focuses on key topics and the Internet's more frequently used services, including: making the most of limited access; conducting focused and efficient searches with tools like WAIS, World Wide Web, archie, veronica, and gopher; and understanding how Bitnet is related to the Internet and how to take advantage of the resources it provides. ($24.95) John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158. 1-800-263-1599.

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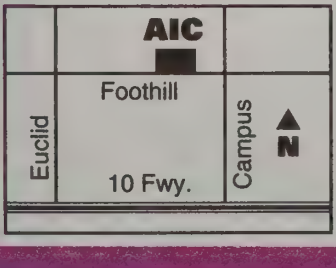

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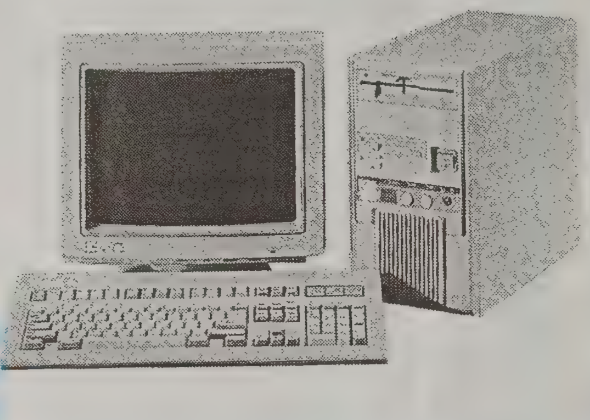

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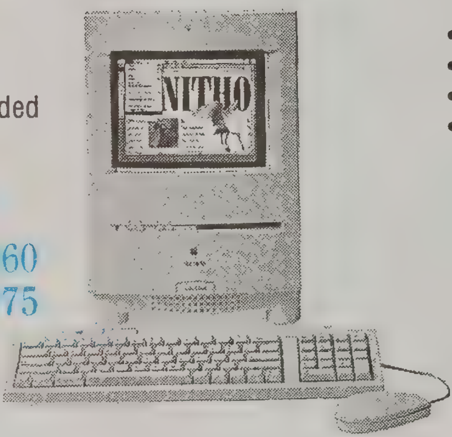

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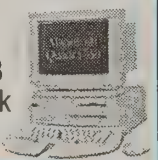

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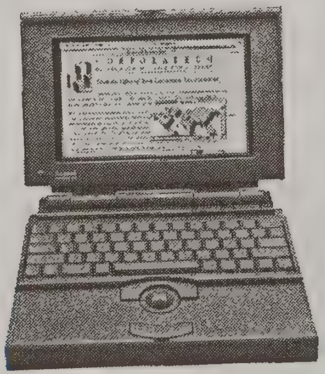

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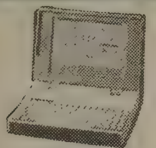

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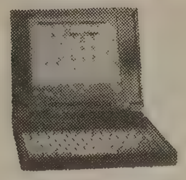

486SLC-33

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- Logitech Trackball
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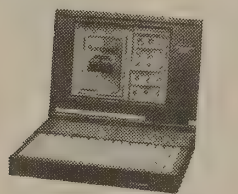

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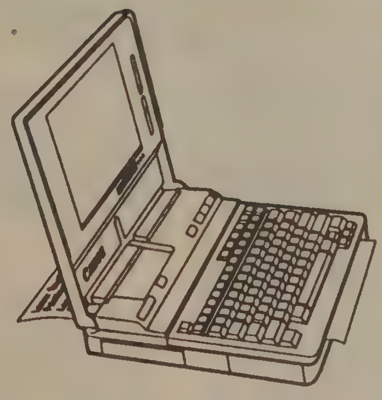

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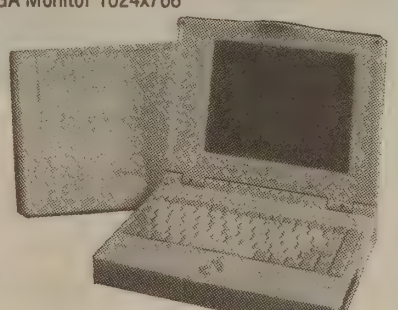

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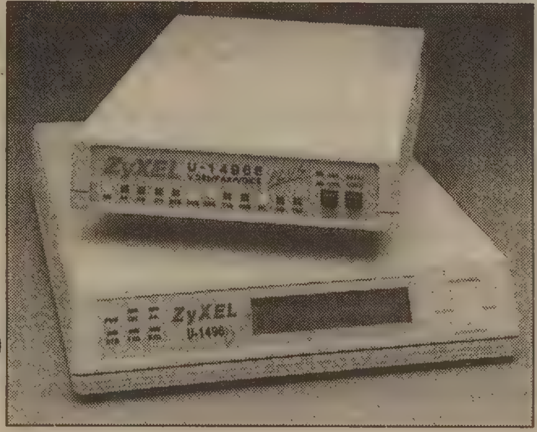

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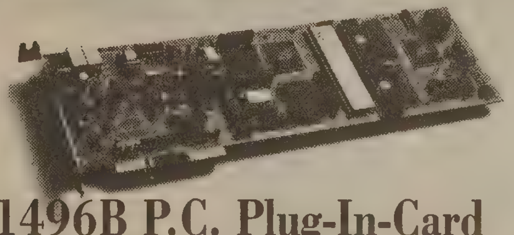

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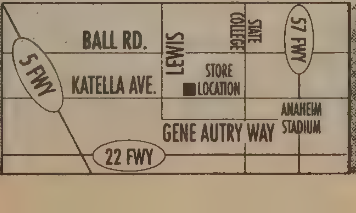

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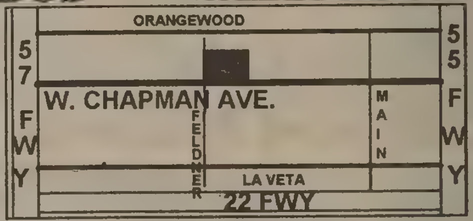

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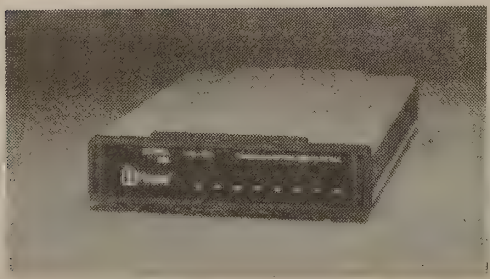
PRODUCT SPOTLIGHT

Continued from page 98

Telecommunications Hardware

U-1496P
ZyXEL



Top: ZyXEL U-1496P Portable Modem; bottom: Hayes Optima 288 V.FC + Fax.

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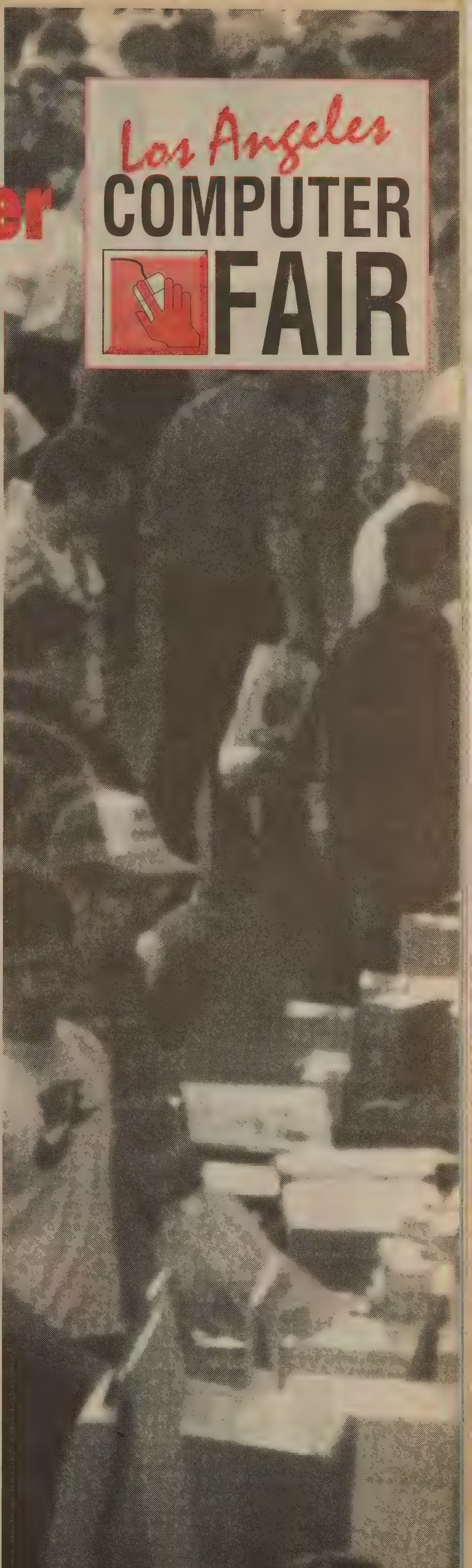

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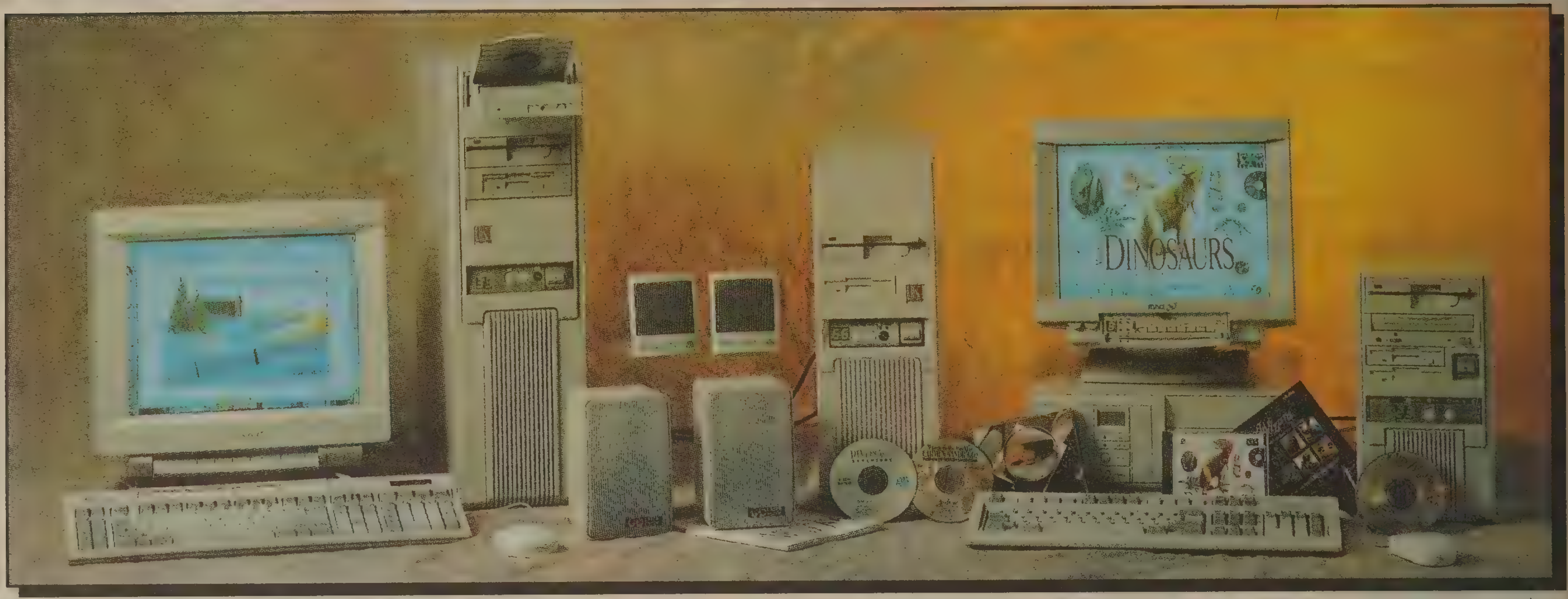

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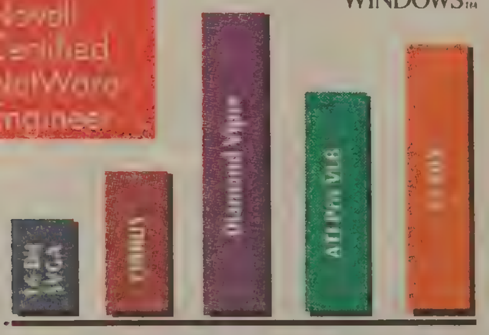

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BOCA V.FAST MODEM

The new Boca V.Fast Class modem, based on the Rockwell V.Fast Class chip set, transmits data at 24,000bps with fax capabilities at 14,400bps in both send and receive. It supports V.42/MNP2–4 error correction and V.42bis MMP5 data compression for data throughput up to 115,200bps. Bundled software includes fax and data communications software for Windows and MS-DOS. Boca also includes a free 16C550 UART serial card with the external V.Fast mode. ($295, internal model; $495, external model) Boca Research, Inc., 6413 Congress Ave., Boca Raton, FL 33487. (407)997-6227.

REVIEWS

PC Software Reviews

CARDSNOW

Published By: Topitzes & Associates, Inc.

List Price: $39 (additional clip art collections, $19 each or three for $49)

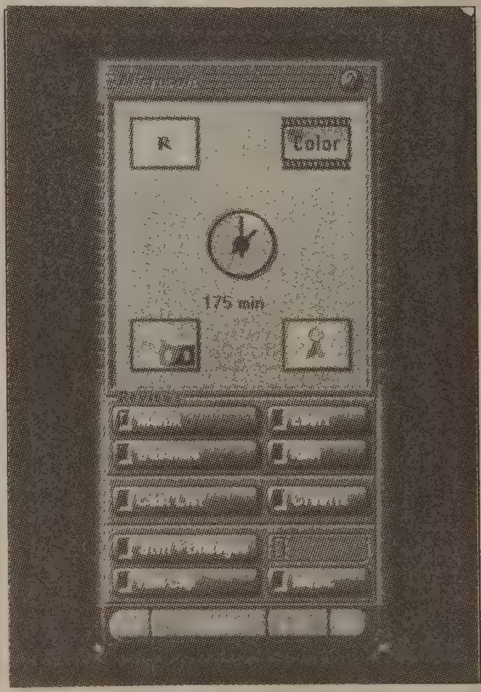
Reviewed By: Ed Kahn

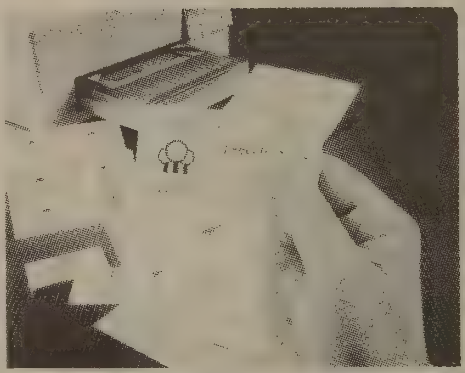
One of the things I had hoped to do on my computer after I got my first laser printer was create business cards. After all, working in either DOS or Windows should give me all the fonts I would need and it seemed that it should be easy enough to design an attractive business card and print it out on my high-quality printer.

But, alas, the quest for the software to do what seemed like a simple task proved elusive for quite some time. Finally, last year, someone told me about CardsNow, a program that runs in MS-DOS and comes with a starting supply of card stock. More recently, a new edition was released that works with both laser and inkjet printers.

CardsNow lets you design a standard business card with or without graphics. You can select up to two fonts, one for the primary line or lines, and one for the remaining lines which would include such information as phone numbers, addresses, and perhaps a descriptive line. Unfortunately, the choice of fonts and sizes is limited, but certainly adequate.

It comes with a set of clip art images that can be used in the cards. Topitzes & Associates sells additional graphics packages designed for the building trades, music, religious groups, schools, and several other audiences. Art from other sources can be imported or you can have your artwork scanned for $39 by Topitzes & Associates.





Top: Cinemania by Microsoft; bottom: CardsNow by Topitzes & Associates, Inc.

I found the program easy to use and quite satisfactory for simple business cards. After designing the card, you can print directly onto the card stock or a sheet of standard paper. On my first attempt, I printed on the card stock. I was a little disappointed because the perforations on the card stock were a little off, making the cards not completely centered. The next time, I decided to print onto plain white paper stock and then went to a copy shop and had it copied onto an attractive card stock in a color of my choice and cut to size.

While the cards you get with this program are certainly not comparable to expensive cards with multiple colors and raised type that are printed by a print shop, the output is quite satisfactory, especially for cards you need in a hurry. CardsNow is exactly what I expected when I first dreamed of making my own business cards on my LaserJet. Still, I look forward to a Windows version of the program that will offer greater choice of fonts and type size. (Topitzes & Associates, Inc., 4200 University Ave., Suite 2000, Madison, WI 53705-2159. 1-800-233-9767)

CINEMANIA

Published By: Microsoft

List Price: $99

Reviewed By: Rich Grace

Cinemania is a wonderful reference, offering any movie enthusiast a real treat. The CD-ROM disc is comprised of a database of short movie assessments—almost nineteen thousand movies from the US and abroad, from the 1915 release of *Birth of a Nation* to the present. Cinemania offers a large number of remarkably crisp grayscale movie stills and photos of major movie stars, directors, and personalities of the screen (and biographies and filmographies as well), and extends into the multimedia realm with dialog clips from selected classic movies.

As could probably be expected, the sound clips are of indifferent quality (and you need a sound card to take advantage of them); but for those whose computers are mute, Cinemania still has lots to offer. The user interface replicates a video remote-control, and is otherwise relatively sparse. The content is absorbing, however, particularly in the detailed reviews. I've rediscovered some wonderful movies I had long since forgotten, and have whiled away numerous late-night hours hunting down movies to see what critical assessments are offered. Occasionally, of course, I don't agree with Leonard Maltin's reviews (who always agrees with movie

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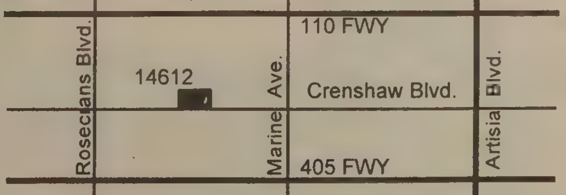

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critics anyway?), but that's not his fault, and his style is engaging and informative. I could also have done without the large number of TV movies that were included in the disc. Also note that the list of movies can be numbing after awhile, but you can accelerate the search by specifying a title or part of one. You can also be impressed by the sheer number of silly and useless movies that have been immortalized in celluloid! (Microsoft Corp., 206/882-8080)

MS-DOS 6.2

Published By: Microsoft

Reviewed By: Woody Liswood

MS-DOS 6.2, the upgrade to 6.0, is here and is also free—at least it is free if you download it from CompuServe.

Among the new features that Microsoft has added is one called Scandisk—something that you might feel like me that it should have been there all along. In many ways Scandisk takes the place of Chkdsk, which is still there, and will fix a variety of disk errors such as crosslinks and logical lost clusters, as well as performing a surface scan to fix physical disk errors.

One of the biggest complaints about 6.0 was problems associated with Doublespace. Microsoft's analysis told it that the majority of these problems were caused by users turning off their computer before Smartdrv could finish writing to the hard drive. To resolve this, DOS 6.2 installs Smartdrv without write caching turned on. Thus, when you write to cache, no longer will you see a DOS prompt until the write cache is written to the disk. To be honest, I can't "see" the difference, but Microsoft assures me that is what is happening.

One of my favorite features of 6.0—the ability to step your way through the config.sys file—has been extended to the autoexec.bat startup in 6.2. Yes, you can now step your way through the autoexec.bat. Stepping also works for other .bat files you may have called in your autoexec.bat file.

Diskcopy has *finally* been improved to work as a single pass copy program.

Have you ever moved or copied a file, only to overwrite a version of the file you really wanted to keep? In 6.2, Move, Copy, and Xcopy warns you when you are about to overwrite a file and asks for permission to do so.

A welcome addition to Smartdrv is that it now caches CD-ROM drives.

DOS 6.2 is the way to go. If you've got 6.0, get the upgrade. If you're still running DOS 5.0, you really need to upgrade today. The features of 6.0 and 6.2 are well worth it. The wait now begins for the release of MS-DOS 7.0 which, if rumors are correct, will be 100% graphical. (Microsoft Corp., 206/882-8080)

FORMS XPERT

Published By: Horizon Software

For: MS-DOS

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Reviewed By: David A. Simon, CPA

Anyone needing to prepare a low volume of any specific tax return (other than for individual income tax) can either buy specialized, sometimes costly tax software or prepare the returns by hand. If you go the manual route, stock up on white-out; every time you

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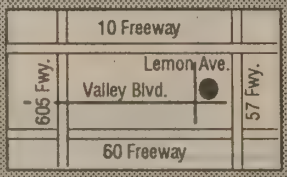

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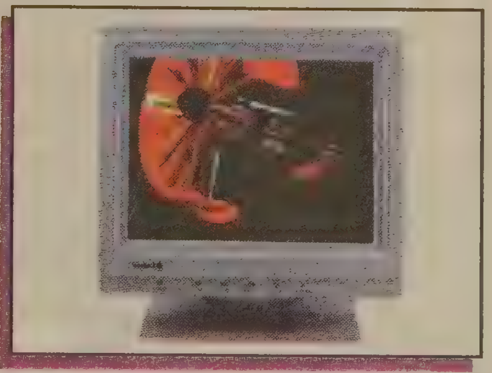

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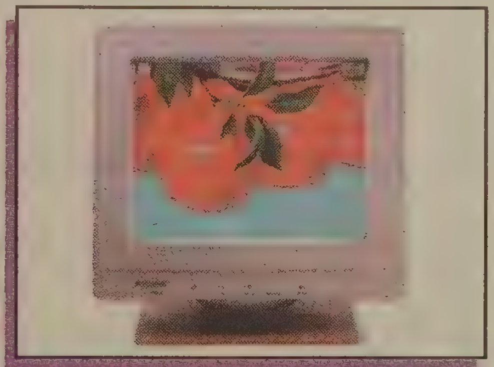

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Minimum order $300 or Qty 10+. Call for Dealer Qty Discounts and other products (Printers, RAM, P.S.) prices.

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revise one item, you'll likely need to carry the revision through to other lines throughout the return.

Forms Xpert offers a middle ground between these two choices. This software package consists of over one hundred "smart" forms. Unlike tax preparation software, Forms Xpert won't automatically decide which schedule and on what line an item should be reported. But neither is it simply a blank form presented on your computer.

Rather than straight, fill-in-the-blanks format, blank forms, Forms Xpert contains arithmetic logic, automatically adding numbers and carrying them forward to other schedules as indicated on each form.

Forms Xpert includes forms for estate tax returns, qualified retirement plans, and income tax returns for fiduciaries, partnerships, corporations, and nonprofit entities, plus a variety of miscellaneous forms. The program includes its own laser soft fonts. Alternatively, you can use the Hewlett-Packard tax fonts cartridge, or equivalent.

I tested the package on a client's estate tax return. To assure adequate control, I prepared spreadsheets and checked that each total on my spreadsheets agreed with the return. The program performed flawlessly. I had no trouble running it and never needed to refer to the documentation. The output on my laser printer was very sharp and far more professional looking than had the return been manually typed, and clerical preparation was infinitely easier. (Horizon Software Corp., 2213 M Street N.W., Washington, DC 20037. 202/872-0295)

WORLD LIBRARY: LIBRARY OF THE FUTURE

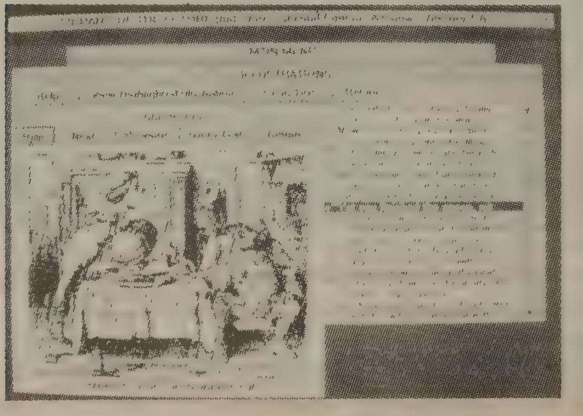
Published By: World Library Inc.
List Price: $295
Reviewed By: Rich Grace

The scope of this product is monumental. The Library of the Future is an attempt—largely successful—to provide a CD-ROM of the enduring works of world literature, including history, philosophy, and religious works. It's like having the *Great Books of the Encyclopedia Brittanica* on a disk, but the scope is even greater than that. Virtually every Classical Greek and Roman work is present, as is the *Bhagavad-Gita*, the *Koran*, the *King James Bible*, the Egyptian *Book of the Dead*, the Mayan *Popol Vuh*, the *Book of Mormon*, plus the complete works of Shakespeare and Sir Arthur Conan Doyle, massive numbers of ancient and modern novelists and poets, and so on. If you can name a classic author, you will probably find them here!

While it's possible to print out an entire book for reading in hard copy, the real strength of this disc is its convenience for students and writers who need to reference or excerpt a major work and don't feel like retyping an entire paragraph or page from a book. For that purpose, and despite the somewhat unfriendly user interface, it is fairly easy to search by title and then look for a known sequence of words in the text. Unfortunately, it was difficult to select more than a paragraph or two in either the DOS or Windows versions—you can't easily scroll down as you select text. This makes cutting and pasting large blocks of text difficult or sometimes impossible.

For anyone with a laptop, the ability to select a single book and save it as a file for portable reading is a major selling point. To do this you must print a book to a file (rather than selecting the text and saving it out). Even after printing the text to a file, you will find frequent and distracting paragraph and chapter notations, which may be a leftover from the OCR process of building the text files. Also, despite the massive scope of the disk, I found myself missing many titles—only one of Friedrich Nietzsche's major works is present, and many classic novelists are represented by just one work. (World Library states that many missing titles will be added in an upcoming release).

Despite my complaints, Library of the Future contains many books which can sometimes be difficult to find in the typical bookstore. Much to my surprise, I was fairly comfortable reading books on the computer screen instead of in hard copy. This disc fills many major gaps in my library. I recommend Library of the Future as a product with great potential, which fills a good niche as a reference source. With an update to fix glitches in text portability and glaring title omissions, Library of the Future will be an outstanding product for any literate computer user. (World Library, Inc., 1-800-443-0238) ■



continued from page 27

of press deadline).

The Association of Bay Area Governments (ABAG) is actively investigating how it might serve it's members—one hundred cities and nine counties—that are increasingly interested in setting up or otherwise facilitating "civic nets." These are local public computer networks that provide 24-hour-a-day, 7-days-a-week access-from-anywhere to local government information, agendas, minutes, policies, procedures, permit applications, community-issues discussions, school information, library resources, etc.

By the time this is in print, the Commission on the Future of the California Courts should have released its comprehensive recommendations for totally revamping the state and local court system—a proposal that reportedly includes *extensive* recommendations for a "paperless judiciary." The cyber-court proposals reportedly came from a Technology Committee within the Commission, headed by Associate Justice George Nicholson (3rd District Court of Appeals, Sacramento). Who knows—maybe someday, even people without high-priced lawyers might be able to obtain something akin to equal access to the court system. (They aren't calling it "cyber-court;" I'm calling it that.)

> *It appears that even the largest state filing (e.g. for a gubernatorial candidate) can easily fit on a single floppy diskette (probably even without using data compression).*

And an open-government advocate in the Texas Legislature—State Representative Glen Maxey (Austin)—has just heard about AB1624 and wants to do the same thing in Texas.

THE HORSE'S MOUTH

I'll be speaking about "Modern (Electronic) Access to Government" before the Commonwealth Club in San Francisco, May 5 at 5 pm (415/597-6700).

I'll also discuss "Realworld Civic Networking" at a meeting of the IEEE Society on the Social Implications of Technology, Silicon Valley Chapter, February 10 at 7:30 pm (415/948-9275 or dpaull@infoserv.com). ■

Jim Warren founded InfoWorld, Wireless Digital, Initiative, Inc., and one of the nation's largest public microcomputer conventions. He was founding host of PBS's, Computer Chronicles, *founding editor of* Dr. Dobb's Journal, *and has chaired various trade and professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics & statistics. He has been a computer professional since 1968, and was a mathematics teacher and professor for ten years before that.*

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991), was one of the first to receive the Electronic Frontier Foundation Pioneer Award (1992), and led the recent successful effort to make state legislation and statutes available via the public nets without state charge. He is also a member of Autodesk's board of directors.

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CREATIVE LAB MULTIMEDIA UPGRADE KIT: - Sound Blaster Pro Delux/Panasonic Double Speed CD-ROM, Mini Speakers, 6 CD Titles, -Microphone Karaoke	425
Multimedia Upgrade Kit -Media Vision's Pro Audio Spectrum 16 -Toshiba 3401B CD-ROM 200ms 300KB/S Transfer Rate -One Pair Stereo Speakers -3 CD and 6 Titles Includes: Ency, Animals, Reference Library, U.S. Atlas, World Atlas & Secret of Monkey Island	638

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WD 420MB/13MS IDE	350
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QUANTUM 540MB IDE/SCSI	515/CALL
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TOSHIBA 1.05GB/12MS/SCSI II	879
TOSHIBA 1.2GB/12MS/SCSI II	969

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Promise-DC200 ISA IDE Caching Cntrl, 4HD/2FD (up to 16MB)	109
Promise-4030VL VLB 32BIT IDE Caching Cntrl, 4HD/2FD (up to 16MB)	159
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Promise-2000VL VLB 32BIT IDE/IO Cntrl, 50MHz up to 4MB/Sec	39
Adaptec 1542C SCSI Ctrl Card	205
Adaptec 1542CK SCSI Ctrl w/Novell S/W (Bus Master)	255
Adaptec 2742T EISA SCSI-II Ctrl (Bare)	360
Adaptec 2742TK EISA SCSI-II Ctrl w/Novell S/W (Bus Master)	410
Adaptec 2842VLK VLB SCSI II Ctrl w/Novell, OS2 S/W	**305**
Adaptec 2842 VLK (OEM) SCSI-II Ctrl w/Cables & Drivers	139
Ultrastor 15C ISA IDE Caching Ctrl, 2HD/3FD, w/Drivers (up to 8MB)	179
Ultrastor 14F ISA SCSI Ctrl, 32K Cache Buffer	205
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Ultrastor 34F VLB SCSI Ctrl (HD) 32K Cache on board	275
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DTC 3290HD EISA SCSI Caching Ctrl, (0K up to 4MB)	437
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Diamond Stealth Pro (ISA) 1MB VRAM w/$600 FREE Software	245
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FOCUS 103K WITH TRACKBALL	42
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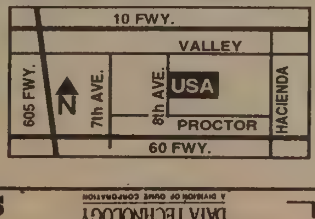

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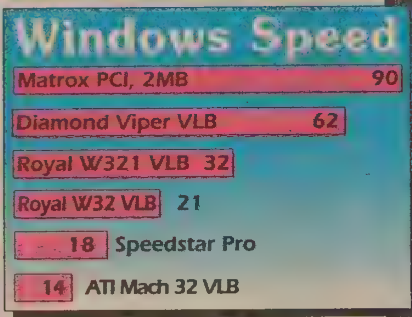

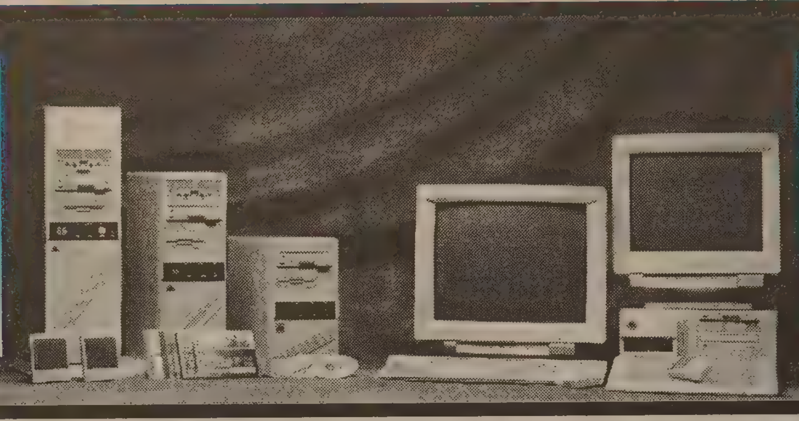

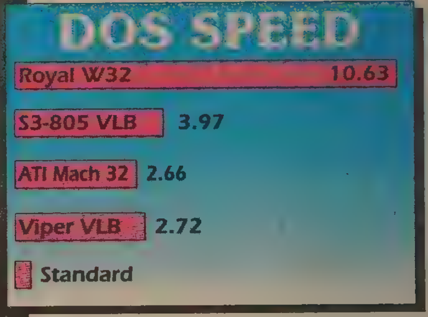

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EISA 486 50MHz DX2 w/64K & CPU	510
EISA 486 50MHz DX w/64K & CPU	590
EISA 486 66MHz DX2 w/64K & CPU	640
ISA 386 40MHz SX w/CPU	85
ISA 386 40MHz w/64K & CPU	128
ISA 486 25MHz SX w/CPU	180
ISA 486 33MHz SX w/CPU	195
ISA 486 33MHz w/64K & CPU	375
ISA 486 50MHz DX2 w/64K & CPU	445
ISA 486 50MHz DX 64K & CPU	525
ISA 486 66MHz DX2 w/64K & CPU	585
VLB 33MHz w/128K Cache & CPU ZIF	390
VLB 50MHz DX2 w/128K Cache & CPU ZIF	460
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Orchid Fahrenheit S3-805 VLB 1MB Exp. to 2MB	**155**
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Orchid Celsius VLB 2MB VRAM	270
VLB SVGA Cirrus Logic 1MB	85

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Alpha Research VLB IDE Caching	165
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DTC 2290 EISA IDE	95
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Ultrastor 34F VESA LB SCSI	275
Vesa Local Bus Controller w/ I/O	**30**
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CTX 1561/1561LR 15" 1280 x 1024 NI	325/360
CTX 1760F/1760LR 17" 1024 x 768	775/785
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KFC 17" (1280x1024)	765
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Focus 9000 Programmable	55
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Keytronic 101 Key	35
Lite On/Mitsumi 101 Key	30
Northgate 101 Key	55
Northgate 102 Key	75
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Ethernet 16 Bit Generic	$55
Ethernet 16 Bit Novell	139

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Mitsumi FX-001 Int. D-Spin w/Int. Card 250ms	**$215**
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Trakker 250 Ext.	350

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continued from page 30

handwriting recognition problems overwhelm this.

IN OTHER NEWS

•PC and Mac File Sharing for Zoomer
Palm Computing has announced PalmConnect, a set of connectivity software tools for linking Zoomer PDAs to IBM compatibles and Macintoshes. This software will allow the Tandy/Casio Zoomer to back up and exchange information with desktop PCs. Data transfer to and from personal information management software (PIMs) and palmtop organizers such as the Casio B.O.S.S. is supported. PalmConnect will retail for $129 for the IBM PC version. The Macintosh version will be available early this year, but pricing has not yet been determined.

•Day-Timer™ Software for Newton
Slate Corporation has announced that it is shipping the Day-Timer Meeting & Expense Pack for the Apple Newton. This includes expense tracking and meeting agenda/scheduler software, and is fully integrated with the other MessagePad applications such as the Calendar. The software is available on disk for $129, and can be downloaded to an Apple Newton via the Newton Connection Kit from Apple.

•40MB Flash RAM Card
SunDisk Corporation is the first to introduce a 40MB PCMCIA flash disk card, the SDP5A-40. The formatted capacity is 41.9MB, which can be doubled to 80MB using the compression software that is included with the card. The card is guaranteed for two hundred thousand cycles of write/erase cycles per sector, which means it can be used for up to two hundred thousand repeated writes before it's in danger of "wearing out." Using SunDisk's built-in "wearout-leveling" algorithms to evenly distribute wear across the card, it is expected that more than sixty years of heavy Windows use would be required before the card would have any endurance-related difficulties.

•NE2000-compatible PCMCIA Ethernet card
Socket Communications, Inc. has released its SocketLink EA and EA+ Ethernet cards, the first specially designed for the HP Omnibook 300 sub-subnotebook PC. The SocketLink EA card handles 10BaseT Ethernet, and the EA+ handles 10BaseT and 10Base2 communications.

The OmniBook, when hooked up to one of these cards, has drivers for Novell NetWare, NetWare Lite, Microsoft LAN Manager, IBM PC LAN, Artisoft LANtastic, Banyan VINES, and other networks. The cards are also capable of emulating the popular Novell NE2000 Ethernet card, allowing you to use standard, off-the-shelf NE2000 drivers for the card. The card includes a 64K buffer for fast operations, comparable to an ISA bus Ethernet adapter. According to Socket, the adapter runs up to four times faster than LAN adapters, which use the parallel port of the OmniBook. The EA card will retail for $399, and the EA+ for $420.

•PCMCIA SCSI card
The New Media Corporation has announced the Visual Media SCSI PCMCIA card. The card ships with New Media's ASPI manager and CorelSCSI v2 software, allowing users to configure the card via software, without having to set jumpers or switches. The card supports data rates of up to 200% that of parallel port SCSI adapters. The card is compatible with Windows NT and the MPC standard, and supports SCSI II. The card will retail for $339 including the CorelSCSI software. ■

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- **340MB IDE Hard Disk**
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- **32-bit VLB SVGA Card/1MB, Graphics Accelerator**
- **15" SVGA, 0.28mm NI Monitor**
- **101-Key Enhanced Keyboard**
- **Hi-Resolution Serial Mouse**
- **9600/2400 Fax/Modem Card**

$1850.00

VESA Local Bus 486DX/33

- **4MB of RAM; 256KB Cache**
- **245MB IDE Hard Disk**
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- **32-bit VLB IDE I/O Controller**
- **32-bit VLB SVGA Card/1MB, Graphics Accelerator**
- **14" SVGA, 0.28mm NI Monitor**
- **101-Key Enhanced Keyboard**
- **Hi-Resolution Serial Mouse**
- **9600/2400 Fax/Modem Card**

$1250.00

Unbeatable 486SX/33

- **4MB of RAM**
- **64KB Cache Memory**
- **170MB IDE Hard Disk**
- **1.2 & 1.44MB Floppy Drives**
- **IDE /FDC Card w/2S/1P/1G**
- **SVGA DisplayCard**
- **14" SVGA, 0.28mm Monitor**
- **101-Key Enhanced Keyboard**
- **Hi-Resolution Serial Mouse**

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Blue Thunder MPC 486SLC2/66MHz

- **IBM VESA Local Bus 486SLC2-66/16KB Internal Cache**
- **4MB Main Memory; 64KB External Cache**
- **340MB Hard Disk; 1.2 & 1.44MB Floppy Drives**
- **VLB Graphic Accel SVGA/1MB; VLB I/O Controller**
- **14" SVGA 1024x768, 0.28mm NI Monitor**
- **101-Enhanced Keyboard; Hi-Resolution Serial Mouse**
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- **SVGA Card/1MB; IDE I/O Controller Card**
- **14" SVGA 1024x768, 0.28mm/I Monitor**
- **101-Enhanced Keyboard; Hi-Resolution Serial Mouse**
- **CD-ROM Drive; Sound Card**
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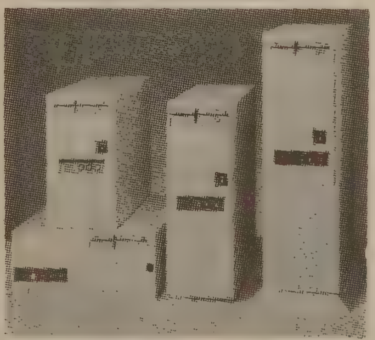

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386DX-40 486DLC-40

386DX-40	$1039
486DLC-40	$1099

Systems Include: Motherboard & CPU 4Mb RAM, 1.2Mb & 1.44Mb FDD, 200Mb IDE HDD w/IDE Controller, 1Mb SVGA Card, DigiView 1401 14" SVGA Monitor, Mini-Vertical Case w/230W P.S., 101 Key Keyboard, Includes DOS Operating System.

IBM Leopard 486SLC2-66 VLB

486SLC2-66	$1339

Systems Include: IBM Leopard VLB Mbd w/CPU, 64K Cache, Math-Co Included, 4Mb RAM, 1.2Mb & 1.44Mb FDD, 200Mb IDE HDD w/ VLB IDE Controller, 32Bit 1Mb SVGA Card, DigiView 1431 14" SVGA NI Monitor, Mini-Vertical Case w/230W P.S., 101 Key Keyboard, Includes DOS.

486 VLB Multi-Media

486DX2-66	$1869
486DX2-50	$1739
486DX-40	$1729
486DX-33	$1739
486SX-33	$1609
486SX-25	$1569

Systems Include: 486 VLB Mbd, CPU, 256K Cache, ZIF Socket, 4Mb RAM, 1.2Mb & 1.44Mb FDD, 250Mb IDE HDD w/VLB IDE Controller, 32Bit 1Mb VLB SVGA Card, Optiquest 2000DX 15" SVGA NI Monitor, Sony 33A Double Speed CD-ROM, Pro Audio Spectrum 16, CS-150 Speakers, 4 CD-Titles, Mini-Vertical Case w/230W P.S., 101 Key Keyboard, DOS.

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486 VLB Multi-Media

486DX2-66	$2469
486DX2-50	$2339
486DX-40	$2329
486DX-33	$2339

Systems Include: VEGA 486 VLB Mbd, CPU, 256K Cache, ZIF Socket, 4Mb RAM, 1.2Mb & 1.44Mb FDD, 340Mb IDE HDD w/VLB IDE Controller, Orchid Fahrenheit VLB SVGA Card, ViewSonic 15E 15" SVGA NI Monitor, Toshiba 3401 Int. **200ms, 2X Speed CD-ROM**, Pro Audio Spectrum 16, CS-800 Speakers, 6 CD-Titles, Mid-Vertical Case w/250W P.S. & 2 Fans, 101 Key Keyboard, DOS.

Intel Pentium 60Mhz PCI Bus

$3199

System Include: Intel Pentium PCI Mbd, Intel Pentium 60Mhz CPU, 256K High Speed Cache, 8Mb RAM, 1.2Mb & 1.44Mb FDD, 540Mb IDE HDD w/ Onboard PCI IDE Controller, Diamond Viper PCI Graphics Accelerator (Super Fast! Over 80Million WINMARKS), CS-230 Mid-Vertical Case w/ 250Watt P.S. & 2 Cooling Fans, 101 Key Keyboard, Includes DOS. ***Monitor not Included.***

Pentium 60Mhz VLB

$3899

System Include: Opti Pentium VLB Mbd, Intel Pentium 60Mhz CPU, 512K High Speed Cache, 8Mb RAM, 1.2Mb & 1.44Mb FDD, 1.08Gb SCSI-2 HDD w/ Adaptec 2842AK VLB SCSI Controller, Diamond Viper VLB Graphics Accelerator (Fastest Card On The Market!), CS300GTS Full-Vertical Case w/300Watt P.S. & 2 Cooling Fans, 101 Key Keyboard, Includes DOS. ***Monitor not Included.***

486 VLB SX/DX/DX2

486DX2-50	$1409
486DX-40	$1399
486DX-33	$1409
486SX-33	$1279
486SX-25	$1239

Systems Include: 486 VLB Mbd & CPU, w/128K Cache, 4Mb RAM, 1.2Mb & 1.44Mb FDD, 250Mb IDE HDD w/VLB IDE Controller, 32Bit 1Mb VLB SVGA Card, Optiquest 1000S 14" SVGA NI Monitor, Mini-Vertical Case w/230W P.S., 101 Key Keyboard, Includes DOS.

486 VLB DX/DX2

486DX2-66	$1729
486DX-50	$1759
486DX2-50	$1599
486DX-40	$1589
486DX-33	$1599

Systems Include: 486 VLB Mbd, CPU, 256K Cache, ZIF Socket, 4Mb RAM, 1.2Mb & 1.44Mb FDD, 340Mb IDE HDD w/VLB IDE Controller, 32Bit 1Mb VLB SVGA Card, Optiquest 2000DX 15" Digital SVGA NI Monitor, Mini-Vertical Case w/230W P.S., 101 Key Keyboard, DOS.

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486 VLB DX/DX2

486DX2-66	$1869
486DX2-50	$1739
486DX-40	$1729
486DX-33	$1739

Systems Include: VEGA 486 VLB Mbd, CPU, 256K Cache, ZIF Socket, 4Mb RAM, 1.2Mb & 1.44Mb FDD, 340Mb IDE HDD w/VLB IDE Controller, Orchid Fahrenheit VLB 1Mb SVGA Card, ViewSonic 15E 15" Energy Saving FST SVGA Monitor, Mid-Vertical Case w/ 250W P.S. & 2 Fans, 101 Key Keyboard, DOS.

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486DX2-50	$2379
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Systems Include: VEGA 486 PCI/VLB Mbd, CPU, 256K Cache, ZIF Socket, 4Mb RAM, 1.2Mb & 1.44Mb FDD, 340Mb IDE HDD w/PCI IDE Controller, Diamond Viper PCI (on DX2-66/DX-50), Orchid Kelvin 64 PCI (on DX2-50/DX-40), ViewSonic 15 15" Energy Saving FST SVGA Monitor, Mid-Vertical Case w/250W P.S. & 2 Fans, 101 Key Keyboard, DOS.

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Features: Intel 486SX 33Mhz CPU, 4mb RAM, 120mb HDD, 5.9lbs, Digital Controls, Passive Matrix Color, Windows Accelerator, Built-In Trackball, Optional Mini-Docking Station

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Features: Intel SL Enhanced 486SX-25Mhz CPU, 4mb RAM, 80mb HDD,Built-in "Palm Rest" Trackball, 9.5" 64 Gray Scale Dual Scan LCD Display, Removable Drive System, **2 PCMCIA Slots.**

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Base Systems Include: *Motherboard, 4Mb RAM, TEAC 1.2Mb & 1.44Mb Floppy Drives, Compatible IDE HDD/FDD Controller w/ 2 Serial, 1 Parallel, 1 Game Ports, CS-609T Mini-Vertical Case w/230Watt P.S., Chicony 5311 101 Key Enhanced Keyboard, Complete w/ DOS*

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OPTI Mini 486 VLB M/B w/128K .... *Cache, 2 VLB Slots*	**$538**
OPTI Mini 486 VLB M/B w/256K .... *Cache, 2 VLB Slots*	**$558**
OPTI Mini 486 VLB M/B w/256K .... *Cache, 2 VLB Slots, ZIF Socket*	**$566**
OPTI PENTIUM VLB M/B w/512K ... *Cache, 2 VLB Slots,Pentium CPU Fan* ***Includes CS-230 Mid-Vertical Case*	**$980**
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IBM Base Systems w/ IBM Motherboards

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Base Systems Include: *Motherboard, 4Mb RAM, TEAC 1.2M 1.44Mb Floppy Drives, Compatible IDE HDD/FDD Controlle 2 Serial, 1 Parallel, 1 Game Ports, CS-230 Mid-Vertical Case 250Watt P.S. & 2 Cooling Fans, Chicony 5311 101 Key Enhar Keyboard, Complete w/ DOS*

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ESSENCE Premium Base Systems Continued.....

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5 Easy Steps To Follow:

1) Choose one of the "Essence Base Systems".

2) Add a CPU from the following pages.

3) Add a Hard Disk Drive from the next page.

4) Choose a Video Card from the next page.

5) Decide on a Monitor from the next page.

Other options such as: More RAM, CD-Roms, Sound Cards, Mice, Tape Backups, should be added as needed.

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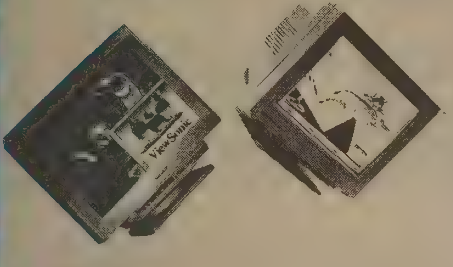
Monitors



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1461LR 14" NI (1024x768, 72Hz refresh)	$310.
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HR-1430ni 14" SVGA NI (1024x768,.28dp)	$263.

MAG

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MITAC

1464P 14" SVGA NI (1280x1024,.28dp)	$310.
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3FGe 15" Color Monitor (1024x768,.28dp)	$625.
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MultiSync 5FGP 17" (1280x1024,.28dp)	$1480.
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17 17" Digital Multi-Freq (.28dp,1600x1280)	$950.
20 20" Digital Multi-Freq (.28dp,1600x1280)	$1510.
21 21" Digital Multi-Freq (.28dp,1600x1280)	$1745.

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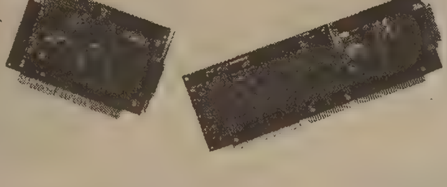
Video Cards



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Tekram DC-600B ISA IDE Caching (up to 16MB)	$110.
Tekram DC-680 VLB IDE Caching (up to 16MB)	$145.
Bus Logic KT445S VLB SCSI Controller Kit	$275.
Bus Logic KT542B ISA SCSI Controller Kit	$225.
Bus Logic KT545S ISA FAST SCSI-2 Kit	$235.
Bus Logic KT747S EISA FAST SCSI-2 Kit	$355.
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DTC-3270VL VLB SCSI-2 Controller	$130.
DTC-3290 **EISA** SCSI **Caching** FD/HD (0K,to 4MB)	$435.
DTC-3292 **EISA** SCSI FD/HD Controller	$325.

Controllers
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UltraStor 24F **EISA** SCSI FD/HD Controller	$370.
UltraStor 24F **EISA** SCSI FD/HD Controller Kit	$410.
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UltraStor 34F **VESA Local Bus** SCSI FD/HD Kit	$325.
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Toshiba 1.44MB FDD (3.5") w/Mounting Kit	$43.
Toshiba 2.88MB FDD (3.5") w/Mounting Kit	$73.
IOmega Floptical Drive w/SCSI Interface (21MB)	$429.
IOmega Floptical Disk (21MB)	$27.
Sysgen ValueStor Floptical Drive w/Kit	$332.
Sysgen ValueStor Floptical Disk - Dual pak	$52.

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CP-30344 340MB IDE HDD (14ms)	$290.
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CP-1060S 1.06Gb Fast SCSI-2 HDD (9ms)	$990.
CP-31370 1.37Gb Fast SCSI-2 HDD (10ms)	$1070.

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M2624FA 520MB SCSI HDD (12ms, 5yr wrnty)	$575.
M2694SA 1.2GB SCSI HDD (10.5ms,5yr wrnty)	$940.
M2652S 2.0GB SCSI HDD (12ms, 5yr warranty)	$1590.
M2654S 2.4GB SCSI HDD (12ms, 5yr warranty)	$1650.

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Maxtor MX-7213S 213MB SCSI HDD (15ms)	$277.
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Maxtor MX-7245S 245MB SCSI HDD (14ms)	$265.
Maxtor MX-7345A 345MB IDE HDD (14ms)	$305.
Maxtor MX-7345S 345MB SCIS HDD (14ms)	$355.
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Maxtor MX-540SL 540MB SCSI HDD (8.5ms)	$735.
Maxtor MXT-1240S 1.2GB SCSI HDD (8.5ms)	$1280.

Drives
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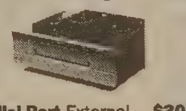

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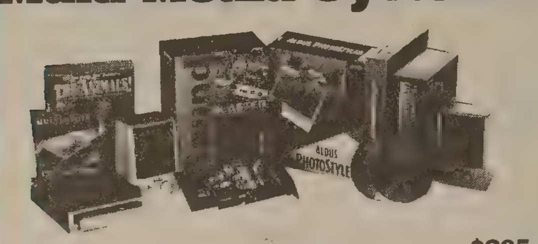

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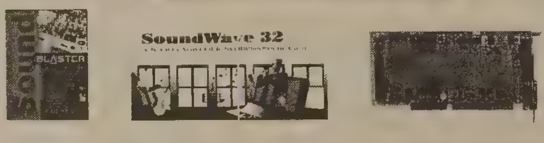

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Sportster 14400 External Data Modem	**$209**
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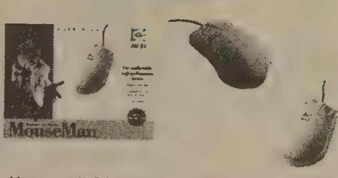

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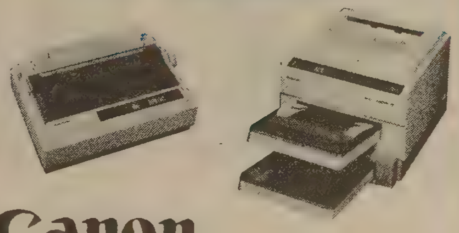
Focus-2001B 101keys Kbd w/Hard Dustcover (Click) - Black	**$45**
Focus-6000 101keys Kbd (Soft click)	**$36**
Focus-8000 111keys Kbd w/ (Calculator, Soft click)	**$45**
Focus-9000 128keys Kbd w/ (Programmable, Click)	**$62**
Fujitsu-4700 101keys Kbd	**$47**
Fujitsu-4870 101keys Kbd	**$37**
Honeywell-101WN 101keys Kbd (3yr. warranty)	**$40**
KT-2000 101keys Kbd (Made by Keytronic)	**$36**
MaxSwitch 101 keys Keyboard	**$36**
MaxiSwitch 124keys Programmable	**$63**

Chassis (Cases)

CS-B01 Baby AT Case w/200W P.S. (3x5.25",1x3.5")	**$51**
CS-20 Baby AT Case w/200W UL P.S. (3x5.25",1x3.5")	**$83**
CS-36 Full Vertical Case w/230W UL P.S. (6x5.25",2HD,Digital)	**$122**
CS-300GTS Full Vertical Case w/300W UL P.S. (7x5.25", Double fan)	**$175**
CS-510 Baby AT Case w/200W P.S. (3x5.25",1x3.5")	**$53**
CS-109T Desktop Case w/230W P.S. (2x5.25,1x3.5)	**$56**
CS-609T Mini Vertical Case w/230W P.S. (2x5.25",3x3.5")	**$54**
CS-609M Mini Vertical Case w/230W P.S. (2x5.25",3x3.5",Digital)	**$56**
CS-740 Mini Vertical Case w/230W P.S. (2x5.25",3x3.5",Door,Digital)	**$64**
CS-760 Mid Vertical Case w/230W P.S. (3x5.25",3x3.5",Door,Digital)	**$86**
CS-780 Full Vertical Case w/230W UL P.S. (4x5.25",2HD,Door,Digital)	**$117**
CS-932 Mini Vertical Case w/230W P.S. (2x5.25",3x3.5")	**$52**
CS-923 Mid Vertical Case w/230W P.S. (3x5.25",3x3.5",Digital)	**$72**
CS-912 Full Vertical Case w/230W UL P.S. (4x5.25",2HD,Digital)	**$105**
CS-836 MPC Desktop Case w/200W UL P.S. & 20Watts Speakers	**$125**

Printers



Canon

Canon BJ-10ex Bubble Jet Printer	**$245**
Canon BJ-200 Bubble Jet Printer	**$330**
Canon BJ-230 Bubble Jet Printer (Wide)	**$408**
Canon BJ-300 Bubble Jet Printer	**$333**
Canon BJC-600 Color Bubble Jet Printer	**$595**
Canon BJC-800 Color Bubble Jet Printer	**$1533**
Canon BJC-820 Color Bubble Jet Printer (Wide)	**$1647**

CITIZEN

Citizen PN-48 Notebook Printer (Professional)	**$225**
Citizen Notebook II Printer (Professional,Optional Color)	**$318**
Citizen GSX-190 Printer (9pin/color option)	**$159**
Citizen GSX-230 Quiet Printer (24pin/270cps/color option)	**$235**
Citizen GSX-240 Quiet Printer (24pin/300cps/80col/color opt.)	**$290**
Citizen GSX-145 Printer (24pin/192cps/132col/color option)	**$365**
**** Color Kit for Citizen 200GX, GSX-230 or GSX-240*	***+43***

Epson Action Printer 2250 (9pin)	**$120**
Epson Action Printer 3250 (24pin)	**$179**
Epson FX-870 Printer (9pin)	**$275**
Epson FX-1170 Printer (9pin, Wide)	**$368**
Epson LQ-570+ Printer (24pin)	**$249**
Epson LQ-870 Printer (24pin)	**$455**
Epson LQ-1070 Printer (24pin, Wide)	**$365**
Epson LQ-1170 Printer (24pin, Wide)	**$625**
Epson LQ-2550 Printer (24pin, Wide)	**$930**
Epson Action Laser 1500 (1MB,6ppm)	**$680**
Epson EPL-8000 Laser Printer	**$885**

Panasonic Office Automation OA

Panasonic KX-P1150 Printer (9pin/240cps/80col)	**$139**
Panasonic KX-P2023 Quiet (24pin/240cps/80col)	**$199**
Panasonic KX-P2123 Quiet (24pin/240cps/80col/color opt.)	**$235**
Panasonic KX-P2124 Quiet (24pin/320cps/80col/color opt.)	**$315**
Panasonic KX-P2624 Quiet (24pin/300cps/132col)	**$389**
**Color Kit for Panasonic KX-P2180, KX-P2123 or KX-P2124*	***+45***
Panasonic KX-P4400 LED Page Printer (4ppm/512k/300dpi)	**$519**
Panasonic KX-P4410 Laser (5ppm/512K/300dpi)	**$549**
Panasonic KX-P4430 Laser w/SaintPrint (5ppm/1MB/300dpi)	**$659**
Panasonic KX-P4440 Laser w/SaintPrint (10pm/1MB/300dpi)	**$1189**

**** Please call for Panasonic Printer Accessories and Comsumables Products*

OKIDATA

Okidata ML320	**$307**
Okidata ML321	**$430**
Okidata OL400P LED Page Printer	**$557**
Okidata OL810 LED Page Printer	**$920**
Okidata OL830 Plus LED Page Printer	**$1105**
Okidata OL850 LED Postscript Printer	**$1227**

hp Hewlett Packard

Hewlett Packard Portable Printer	**$395**
Hewlett Packard DeskJet 500 InkJet Printer	**$350**
Hewlett Packard DeskJet 550C Color InkJet Printer	**$699**
Hewlett Packard LaserJet 4L Personal Laser	**$675**
Hewlett Packard LaserJet 4P Laser	**$995**
Hewlett Packard LaserJet 4 Laser	**$1445**
Hewlett Packard LaserJet 4M Laser	**$1985**

Chassis (Cases) Continued

Diamond Series: (Black color model available +$3.00)

CS-130 Full Vert Case w/250W UL P.S. (4x5.25",2HD,Digital)	**$126**
CS-230 Mid Vert Case w/250W UL P.S. (4x5.25",2HD,Digital)	**$110**
CS-330 Mini Vert Case w/220W UL P.S. (2x5.25",3x3.5",Dig.)	**$81**
CS-530 Desktop w/250W UL P.S. (2x5.25",2x3.5",2HD,Digital)	**$86**
CS-730 Baby AT w/220W UL P.S. (2x5.25",1x3.5,1HD,Digital)	**$81**
CS-830 Slim Line w/220W UL P.S. (1x5.25",1x3.5",1HD,Digital)	**$81**
2nd Fan for Diamond Series cases (CS-130,CS-230,CS-530)	**$10**

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RESOURCES

Calendar Of Events

CONFERENCES, SHOWS, AND OTHER SPECIAL EVENTS

JANUARY

January 22–23 Computer Show And Sale. Del Mar Fairgrounds, Del Mar. MarketPro. Call: (415)456-6730.

January 27–30 Interactive Technology And Healthcare Conference: Visionary Applications For Simulation, Visualization, And Robotics. San Diego. UC San Diego. Call: (619)751-8841.

January 29 Computer Show And Sale. Earl Warren Showgrounds, Santa Barbara. Computer Marketplace. Call: 1-800-800-5600.

January 30 ACP Computer Swap Meet. Santa Ana. ACP. Call: (714)558-8813.

January 30 Computer Show And Sale. Community Center, Oxnard. MarketPro. Call: (415)456-6730.

FEBRUARY

February 5–6 Computer Show And Sale. Pomona Fairplex. Computer Marketplace. Call: 1-800-800-5600.

February 8–10 HP And Apollo Workstation Expo '94. San Jose. PCI Trade Show Management. Call: 1-800-727-EXPO (3976) or email at workexpo@pcinews.lonestar.org.

February 12 Computer Show And Sale. Sherman Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

February 12 Computer Show & Sale. Anaheim Stadium, indoors. Richard James Corp. Call: 1-800-685-1400.

February 13 Computer Show And Sale. Sequoia Conference Center, Buena Park. Computer Marketplace. Call: 1-800-800-5600.

February 13 Computer Show & Sale. Glendale Civic Auditorium. Richard James Corp. Call: 1-800-685-1400.

February 13 Fourth Annual SCCCA Meeting And Ball. City of Industry. Southern California Chinese Computer Association. Call: (818)912-4733.

February 19 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

February 19 Computer Show & Sale. Ventura Fairgrounds, Ventura. MarketPro Shows. Call: (415)388-8893.

February 20 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

February 20 Computer Show & Sale. Scottish Rite Center, San Diego. MarketPro Shows. Call: (415)388-8893.

February 21–25 Documentation '94 Conference And Exposition. Los Angeles. Graphics Communications Assoc. and Publishing Technology Mangement, Inc. Call: Tanya Boss, (703)519-8174.

February 22–23 CASE WORLD Conference. San Francisco. Smith & Shows. Call: (508)470-3880.

February 26–27 Computer Show And Sale. Pomona Fairplex. Computer Marketplace. Call: 1-800-800-5600.

February 27 Computer Show & Sale. Scottish Rite Center, San Diego. MarketPro Shows. Call: (415)388-8893.

MARCH

March 1–3 Intermedia: International Conference And Expo On Multimedia And CD-ROM. San Jose. Stamford Division. Call: (203)352-8254.

March 5 Computer Show And Sale. Sherman Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

March 6 Computer Show And Sale. Sequoia Conference Center, Buena Park. Computer Marketplace. Call: 1-800-800-5600.

March 12 Computer Show And Sale. Puyallup Fairgrounds, Puyallup. Computer Marketplace. Call: 1-800-800-5600.

March 14–18 Business Software Solutions Software Development Conference. San Jose. Smith & Shows. Call: (415)905-2784.

March 14–18 Software Development '94 Conference. San Jose. Miller Freeman, Inc. Call: 1-800-441-8826.

March 18–20 National Products Computer Fair '94. Los Angeles Fairgrounds, Building 4. National Products. Call: 1-800-800-5600.

March 21–25 Uniform '94 Conference. San Francisco. Smith & Shows. Call: 1-800-225-4698.

Continued

WINTER AND SPRING

UCLA EXTENSION OFFERS 3D STUDIO TRAINING

UCLA Extension will offer the first publicly available course in film and television script previsualization, using Autodesk 3D Studio Release 3. The two-part course provides hands-on training in the latest techniques for the creation of film-quality animation. The course emphasis is on movie script previsualization, or "electronic storyboarding." Each part of the course costs approximately $500. Call: (310)825-9064.

JANUARY 29

COMPUTER SHOW
Santa Barbara

Computer Marketplace computer shows feature over three hundred exhibits with thousands of products, both hardware and software. They are now featuring seminars open to all users—from the beginner to the advanced computer user. Admission is $5.00 and shows are from 10:00 am to 5:00 pm. Earl Warren Showgrounds, Santa Barbara. Call: 1-800-800-5600.

DUE FEBRUARY 15

CALL FOR PAPERS FOR INTERNATIONAL VIRTUAL REALITY AND PERSONS WITH DISABILITIES CONFERENCE
San Francisco

The goal of the "Virtual Reality and Persons With Disabilities" conference is to promote, develop, and commercialize technologies which empower people with disabilities. Sponsors of the conference, the Center on Disabilities at California State University Northridge (CSUN), and the Institute of Electrical and Electronics Engineers (IEEE), have called for papers. Desired topics include policy issues pertaining to virtual reality and disability, access to virtual reality technologies, and virtual reality applications that will benefit persons with disabilities. Submissions are due February 15, 1994. Call: (818)885-2578. Fax: (818)885-4929. Email: vr@vax.csun.edu

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SHOW DATES

January 22 & 23 Saturday & Sunday	**POMONA** - Fairplex (LA County Fairgrounds) Exit Highway 10 at Fairplex Drive. Go North to McKinley, turn right. Turn Left on White Avenue to Gate 14.	Admission: $7.00
January 29 Saturday	**SANTA BARBARA** - (Earl Warren Showgrounds) Highway 101 and Las Positas	Admission: $5.00
February 5 & 6 Saturday & Sunday	**POMONA** - Fairplex (LA County Fairgrounds)	Admission: $7.00
February 12 Saturday	**RESEDA** - Sherman Entertainment Center From 101 Freeway, take Reseda off ramp, turn left (if traveling East) to Sherman Way, turn right, one block to Canby Street. 18430 Sherman Way.	**ADMISSION FREE!**
February 13 Sunday	**BUENA PARK** - Sequoia Conference Center Take the Beach Blvd. Exit off the 91 Freeway, go one block North to 7530 Orangethorpe.	Admission: $5.00
February 26 & 27 Saturday & Sunday	**POMONA** - Fairplex (LA County Fairgrounds)	Admission: $7.00

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RESOURCES

Calendar Of Events continued

March 22–23 The Consumer Online Services Conference: Entry Strategies For Mainstream Media. New York, New York. Jupiter Communications. Call: (212)941-9252.

APRIL

April 18–21 EMA '94: The Annual Conference And Expo Of The Electronic Messaging Association. Anaheim. EMA. Call: (703)524-5550.

April 19–21 Networks Expo. San Francisco. Smith & Shows. Call: (201)346-1400.

MAY

May 2–6 Networld+Interop '94 Conferences. Las Vegas. Interop Co. Call: (415)941-3399.

CLASSES, SEMINARS, AND WORKSHOPS

JANUARY

February 15–17 Client-Server Workshop. Dallas. DCI. Call: (508)470-3880.

February 16–17 Data Communications And Networking Seminar. Los Angeles. Center For Advanced Professional Development. Call: (714)261-0240.

January 23 Intro To The IBM PC Class. Monrovia. The Organizers. Call: (818)303-3311.

January 24 Lotus 1–2–3 4.0 For Windows Class. Monrovia. The Organizers. Call: (818)303-3311.

January 24 WordPerfect 5.1 For DOS Class. Monrovia. The Organizers. Call: (818)303-3311.

January 26 Lotus 1–2–3 For DOS Class. Monrovia. The Organizers. Call: (818)303-3311.

January 27 WordPerfect 6.0 For DOS Class. Monrovia. The Organizers. Call: (818)303-3311.

January 27–28 Windows On Netware Class. Los Angeles. Center for Advanced Professional Development. Call: (714)261-0240.

January 28 WordPerfect 6.0 For Windows Class. Monrovia. The Organizers. Call: (818)303-3311.

January 29 DOS/Windows As Operating Systems Class. Monrovia. The Organizers. Call: (818)303-3311.

January 30 WordPerfect 5.1 For DOS Class. Monrovia. The Organizers. Call: (818)303-3311.

FEBRUARY

February 4–18 What's New In PageMaker 5.0 Class. Los Angeles. UCLA Extension. Call: (310)206-1422.

February 11–12 Microsoft Excel For Windows: A Hands-On Workshop. Los Angeles. UCLA Extension. Call: (310)206-7252

February 19–March 26 Computer Animation And Storyboarding With 3D Studio Class: Part 2. Los Angeles. UCLA Extension. Call: (310)825-9064.

MARCH

March 17–18 Netware Getting Started Seminar. Los Angeles. Center for Advanced Professional Development. Call: (714)261-0240.

March 21–23 Computer-Supported Cooperative Work And Groupware Class. Los Angeles. UCLA Extension. Call: (310)206-7252.

March 30–April 1 The Next Generation Of User Interfaces Workshop: Creative Design And Organizational Realities. Los Angeles. UCLA Extension. Call: (310)206-7252.

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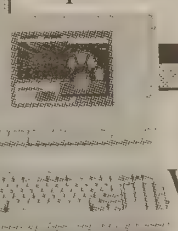

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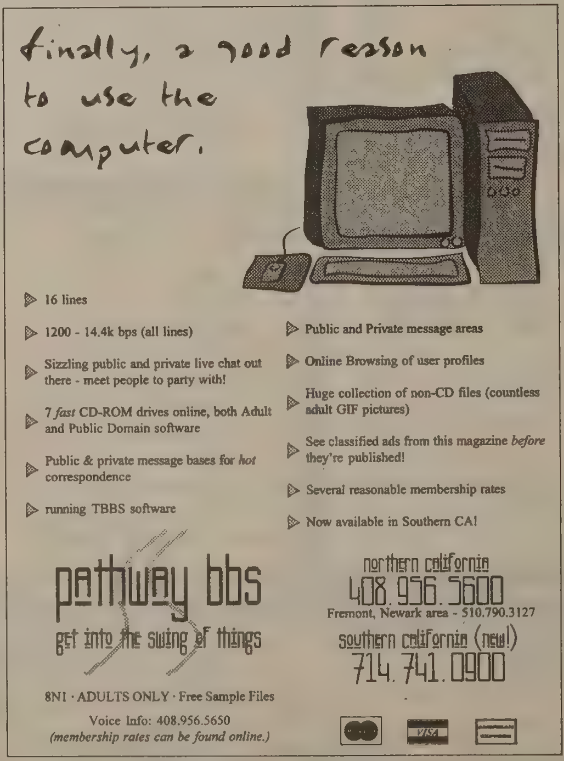

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BBS Spotlight

By John Wolcott

Looking Into The Prism

Have you resolved to start the new year using your modem? I know several folks who have. It's a great way to go beyond your desktop with a computer. If you're new to modem use, you will want to start on a BBS with good online help available. If you're an old hand, you'll want an efficiently run BBS with a wide range of features. At the Prism BBS, you'll find both.

The Prism BBS is located in Lake Forest (near Mission Viejo). It is actually set up inside the Software City computer store. Prism has been in operation for fifteen months and was started by Robert Meyer, alias "Rem," and Ron Naken, alias "Elric." Other sysops crucial to the operation of the system are James Carter, alias "Dopey," and Brett Marxer, alias "Bootay." They work together to produce a system that is appealing to users. Sysop Robert Meyer commented, "We wanted to offer a BBS where the atmosphere is entertaining and the sysops are friendly; staying in touch with user needs." That they have done.

With seven hundred registered users and twenty-five incoming phone lines, this BBS is a busy place. The system runs on Galacticomm's MajorBBS v6.11 software and is supported by a 486/66 computer linked to a 486/33 file server. Intel and US Robotics modems offer baud rates from 300 to 16,800. It supports both ANSI and Ripterm graphics modes.

The system supports most computer platforms including DOS, Macintosh, and Amiga. Features available are teleconference, email, games, match-making, file libraries (including adult-oriented material), and National Teleconference.

When you first log on, you'll be asked to register. Your system time and use will be limited until you are validated by a system operator. Prism is a subscription-based BBS and "demo" time is available until you make membership arrangements.

The Teleconference seems to be the main attraction here. In this BBS feature, you'll be able to chat with other users online. The Teleconference has a multitude of special commands available. You may find these commands difficult to master. Not to worry. Plenty of online help is available and there are forty specially assigned users, acting as conference "moderators," to provide assistance as you need it.

The email forums are networked with MajorNet. Email is a good way to stay in touch with other folks whom you can't seem to catch in Teleconference or even other BBS users across the country. This is a good way to stay on top of information relating to almost any topic; scanning through the messages that have been posted.

Online games offer a chance to drift into another world; interacting with other "players" for many hours of enjoyable role playing and exploration. The games available are Galactic Empire (from all three forbidden lands), Telearena v5.0, Crossroads, and many others. Instructions for game play can be obtained online or

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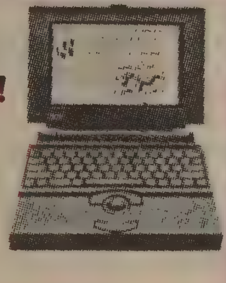

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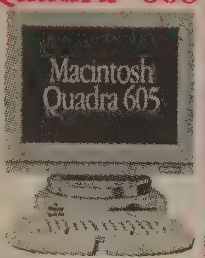

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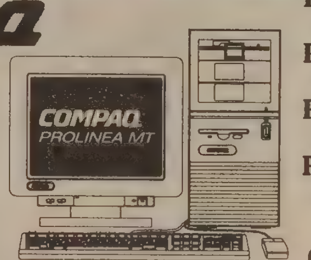

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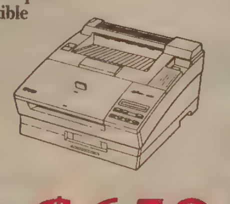

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Kimo's Kinky Korner BBS. (818)858-0098. 2400/ 9600. Adult BBS, adult networks and files, echoing dove-net, quest-net, and kimo net. Fee. Sysop: [Exp. #118.]

The Sports Club BBS. (818)792-4752. 14,400. Sports messaging, sports games, Internet, shareware. [Exp. #121.]

Tin Shack BBS. (818)992-3321. 14,400. Immediate access. 1 Gig at high speed. We help BBS callers. Sysop: Guy Nohrenberg. [Exp. #120]

TNS BBS. (818)919-0777. 24 hrs., 2400/9600/14,400. Eleven major networks, over 150 message subs, 50 online games, 1 Gig of files. Free. [Exp. #120.]

The Wine Connection BBS. (818)718-5994. 8-N-1, 14,400. five lines. Chat, message boards for wine enthusiasts and much more. Free. Sysop: Paul Sennett. [Exp. #120.]

Wizardry BBS. (818)222-4444. 1200/4800/9600/14,400. Chat, games, U/L, D/L, mulitline. Free. [Exp. #120.]

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BBS Pavilion. (909)245-2171. 8-N-1, 24 hrs., 14,400. Shopping mall, CD-ROMs, matchmaker, conferences, games, adult section. $3.00 per month membership. [Exp. #120.]

Castle Of The Dark Sun. (909)468-0621. 24 hrs., 14,400. Online games, 1GB+ CD-ROM, adult Gifs, lots of forums. [Exp. #121.]

The Tavern. (909)591-9149, 591-8310. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Adult, utilities, games, full usenet feed. No fee, no ratios. Sysop: The Bartender. [Exp. #121.]

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BBS Spotlight continued...

even downloaded.

Match-making on the system will allow you to match your attributes with other users. It's a great way to meet others who have similar interests along with the computer modem disease.

File libraries boast a 1GB capacity with a variety of download topics to choose from. All files available for download are automatically virus-scanned every night to safeguard even all files that have been uploaded. Adult-oriented material is offered to those who have been verified as being over the age of 18 with a driver's license fax to the sysop. File library expansion plans include a six-disk CD-ROM library to offer an expanse of "shareware" and "freeware" files. There is no upload/download ratio requirement, however, calls are currently limited to two hours duration. Having a higher speed modem will definitely be a benefit here.

The National Teleconference feature will allow you to chat with computer users nationwide in "real time." Prism is linked to Prostar's Interlink Network to join you in conference beyond the limits of its twenty-five lines.

For social interaction, there is more here than just teleconferences and email. Weekly volleyball (at Boysen Park in Anaheim) and pizza, along with Prism parties, camping trips, picnics, and DOA (Denny's on Alicia in Mission Viejo) appoint users' busy schedules. The users here really enjoy just getting together for a good time. Other special system features include "global commands" and an online Prism News service with all of the latest breaking events and system enhancements. Another great BBS bonus for registered users includes discounts at the Software City computer store in Lake Forest. Prism BBS even takes Mastercard or Visa for subscription. Subscription rates are $5 for ten hours of use or $12 per month for unlimited use.

The Prism BBS can be reached by calling (714)454-9242 with the typical modem parameters of 8-N-1. They also offer local calling from other areas. Numbers from surrounding calling areas can be obtained online. Hours of daily entertainment can be yours with Prism BBS. It proves to be an excellent value for your subscription BBS dollar. ■

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ASSOCIATIONS

Computer Language Society. Meetings: 3rd Wed., 7:00 pm, Veterans Memorial Building, Room A, Overland and Culver, Culver City. Call: Bill Sharpe. (310) 451-9598. [Exp. #119.]

Independent Computer Consultants Association, Los Angeles Chapter. Meetings: 1st Thurs., 6:00 pm. Prepaid reservation, $25, or at the door, $35. The LA chapter provides referral services. Call: (213)872-1811. [Exp. #123.]

Orange County Independent Computer Consultants Association. Call: (714)552-2384. [Exp. #121.]

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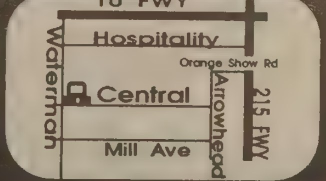

USER GROUPS

ACCOUNTING

M*A*S90 User Group. Meetings: 3rd Wed., 6:30 pm, 22952 Alcalde Dr., Suite 130, Laguna Hills. Call: Ron Jacobs, (714)583-0424 x151. [Exp. #119.]

AMIGA

Amiga Friends User Group. Meetings: 3rd Sun., 1:00 pm, Ocean View High School at Warner and Gothard, Huntington Beach. [Exp. #119.]

Amiga User Group Of Long Beach. Meetings: 1st Thurs., 7:00 pm, 5373 E. Second St., Belmont Shores (in the Fire Station Bldg.). Call: Larry, (310)429-0752. [Exp. #123.]

LAAUG—Los Angeles Amiga User Group. Meetings: 3rd Wednesday, 7:30 pm. Veteran's Memorial Auditorium, Overland Ave. & Culver Blvd. Super SIGs, PD disks. Call: Kip Hammond, (310)390-3010. LAAUGLine BBS: (213)387-1002. [Exp. #123.]

SCAUG—Southern California Amiga Users Group. Meetings: 1st Tues., 7:30 pm, 2nd Floor, Huntington Hall, St. Thomas of Canterbury Episcopal Church, 5903 Arbor Road, Long Beach. Call: (310)630-2712. [Exp. #119.]

APPLE

Champions Of The Mac Proletariat (CHOMP). Meetings: 4th Thurs., 7:30 pm, Cal Poly Pomona. Question and answer, raffle of useful software, opportunity to purchase disks. Call: Craig Richards (909)985-7385. [Exp. #123.]

ATARI

ATESIG—Atari 8-Bit SIG. Meetings: 145 Surf Pl., Seal Beach. Cooperative group for Model Railroad applications. Call: (310)430-5433. [Exp. #123.]

South Bay Atari Computer Enthusiasts (SPACE). Meetings: 2nd Tues., 7:30 pm, Lomita VFW Hall, 1865 W. Lomita Blvd. Active in all user interests since 1981. Call: (310)375-4839 (10am–10pm). [Exp. #119.]

CORELDRAW

(ACAD) User Group. Meetings: 2nd to last Tues., 7:00 pm, Glendale Federal Bank Building, 401 N. Blvd. Product demos, Q&A. Call: Art, (213) 935-1958. [Exp. #123.]

COMMODORE

Commodore Technical Users Group (C=TUG). Meetings: 4th Sunday, 1:00 pm, Senior Citizen Center, 170 S. Olive St., Orange. Public domain library, documents library, and magazine. Software and hardware help. Call: Lou Palush, (714)532-1802. [Exp. #123.]

South Bay Commodore Users Group. Meetings: 3rd Thurs., 7:00 pm. S.C.E Redondo Generating Station, 1100 Harbor Dr. (across from King Yatch Harbor). Support for 64/128 computers. Open to all users of Commodore Computer equipment and those who would like to receive or exchange information on programs, applications, or hardware. Call: Dave LeGalley, (310)324-8357. [Exp. # 123.]

DESKTOP PUBLISHING

Southern California Ventura Publisher User Group (SC–VPUG). Meetings: Last Tues. 7:00 pm, Glendale Federal Bank, Carillon Room, 401 N. Brand Blvd., Glendale. Product demos, Q & A's, library resources. Call: (818)955-5830. [Exp. #119.]

IBM & COMPATIBLES

Greater South Bay PC User Group. Meetings: 2nd Thurs., 7:30 pm, Christ King Lutheran Church, 2706 W. 182nd St., Torrance. Visitors welcome. Call: (310)329-2804. [Exp. #123.]

Long Beach IBM PC And Compatibles User Group. Meetings: 3rd Wed, 7:00 pm, Masonic Temple, 1120 E. Market St., Long Beach. Novice and experienced welcome. $25/yr, $35 for a family. Call: Jim Wells, (310)439-7114. [Exp. #121.]

Orange County IBM PC Users Group. Meetings: 2nd Tuesday, 6:30 pm. Computer Learning Center, 1240 S. State College Blvd., Anaheim. Speakers, software, newsletter. Open to public, all welcome. Call: (714)990-0580 [Exp. #123.]

Pasadena IBM User Group. Meetings: 3rd Wed., 7:00 pm, 2184 N. Lake Ave., Altadena. Speakers on hardware/software, SIGs, library, newsletter, and BBS. Call: Steve Bass, (818)791-1300. [Exp. #123.]

Public Domain Users Group. 1000s of programs for IBM, Commodore, and CP/M computers. For free catalogue write to: T&T Shareware Marketplace, P.O. Box 390644, San Diego, CA 92149. [Exp. #119.]

Thousand Oaks Personal Computer Club (TOPCC). Meetings: 3rd Thurs., 6:30 pm, Goebel Senior Adult Center, 1385 E. Janss Rd., Thousand Oaks. Call: (805)523-1924. [Exp. #123.]

TUG-NET. Meetings: 1st three Thurs., 7:00 pm, Tektronix Corp., 21300 Erwin St., Woodland Hills. Enter through back door of building, press buzzer. Call: (818)249-1629. [Exp. #123.]

Valley Computer Club. Meetings: 1st Wed., 7:00 pm, Glendale Federal Bank, 7119 Topanga Cyn., Canoga Park. BBS, PD library, SIGs, newsletter. All welcome. Call: Estella McClintock, (818)848-1948; or Grayce Hruda, (818)842-3707. [Exp. #123]

KAYPRO

KAYOS Kaypro User Group. Meetings: 4th Mon. of even months, 6:00 pm, El Segundo Library. Call: (310) 379-8339. [Exp. #123.]

MACINTOSH

Champions Of The Mac Proletariat (CHOMP). Meetings: 4th Thurs., 7:30 pm, Cal Poly Pomona, grey building near administration building, rm. P2-7. Call: Craig Richards (909)985-7385 or Mitch Cohen, (909)598-5766. [Exp. #123.]

South Bay Apple Macintosh User Group. Meetings: Last Wed., 8:00 pm, El Camino College, MCSC Rm. 100, 16007 Crenshaw Blvd., Torrance. Call: (310)644-3315. [Exp. #123.]

West Orange County Macintosh User Group (WOCMUG). Meetings: last Tues., 7:00 pm, Carver Elementary School Auditorium, 5335 E Pavo St., Long Beach. Come and join with other Mac Users to share knowledge and experiences. Call: Lynn Goodrich (714)892-8910 or Tony Muller (310)493-1240. [Exp. #123.]

PROGRAMMING LANGUAGES

APL User Group—SoCal SIGAPL. Meetings: 2nd Wed., Los Angeles City College. Membership includes newsletter. Call: G. Smith, (818)716-6271. [Exp. #119.]

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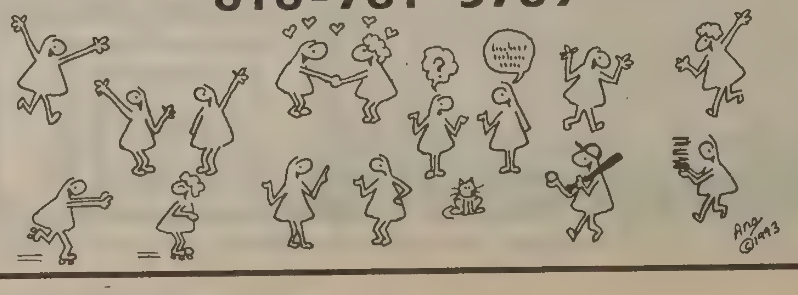

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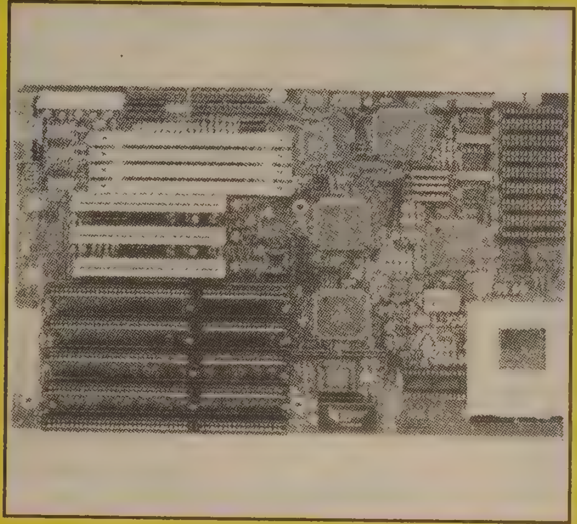

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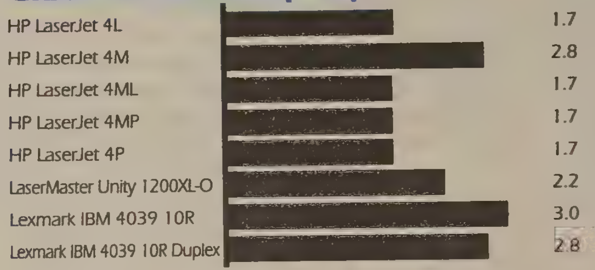

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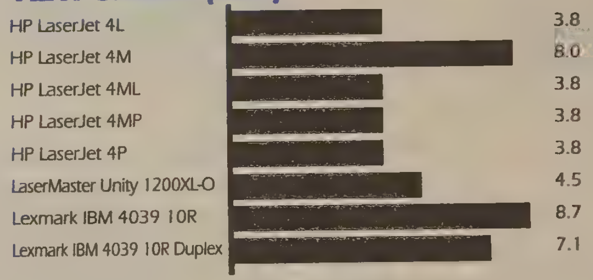

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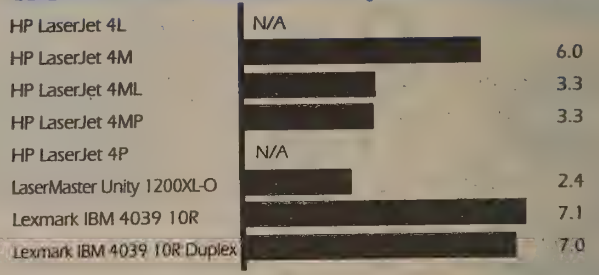

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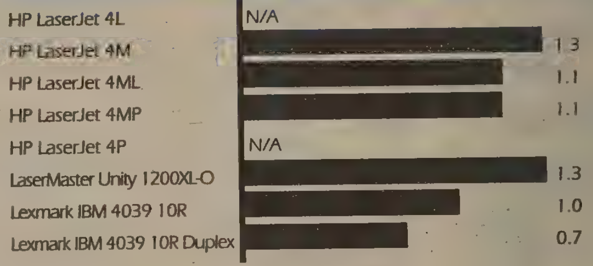

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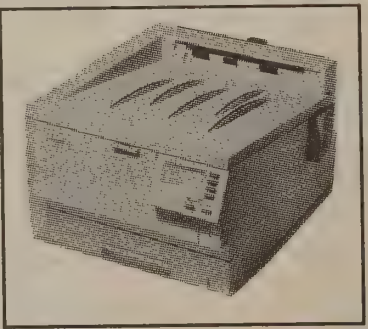

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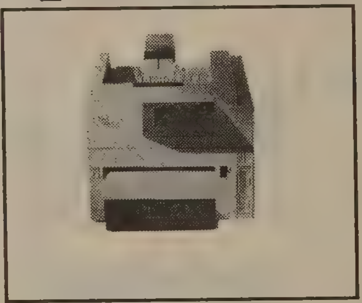

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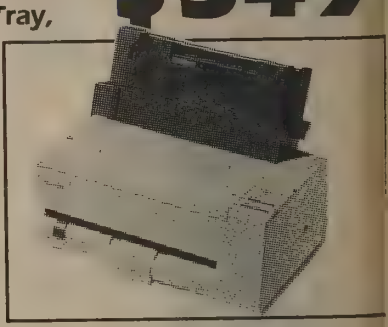

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Multi & Media beyond

MULTIMEDIA 101

Medio Revisited

Three MPC Titles

BY JONATHAN E.

In our November 15 issue (#115), I featured the thoughts and words of the three characters who form SBD Productions, the jokers behind the CD-ROM title Midnight Movie Madness. At that time, the manufacturing of the disc was not complete; my commentary on the title was limited, being based on an abbreviated demo running off hard disk rather than the actual product.

Since then, I've spent some time with the finished version and also with the two other Medio Multimedia titles briefly mentioned in that column. Some further analysis of the titles is offered in this column to illustrate the design and implementation issues that developers—or producers or publishers, whatever you wish to call them—have to contend with as multimedia crosses the boundary between projected future and marketplace reality.

BASIC SETUP AND VIDEO

All three of Medio's titles come with a setup routine that tests your system's video capabilities, whether you have the suggested 256-color support or only sixteen, and whether you have an audio board installed. With no audio board, you're stuck with no sound. If you only have sixteen colors, the video will run, but slowly, and it will dither a lot.

If more than half the video frames are skipped during the test, the program runs using Medio's own Fast Video Playback. This reduces the frames per second to only twelve instead of fifteen, and brings the resolution down to 240 x 180 from 320 x 240. You can toggle between this Fast Video Playback mode, the standard mode, and full-screen playback.

The bad news is that none of these modes is more than barely adequate. You certainly get an idea of what's going on in the video, but to call the picture quality grainy or pixellated would be kind. On a 33MHz 486 machine with a Sirius Logic video card I found the full-screen video to be virtually unwatchable, while the standard play had poor sound sync.

Medio's Fast Video Playback was the default winner, but the twelve-frames-

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Jonathan E. has worked with desktop multimedia since 1988. He also writes about world music and the Archaic Revival for BAM. *His USPS mailing address is c/o SoundSwell, 54 29th St., Richmond, CA 94804. Email: jeve@well.sf.ca.us.*

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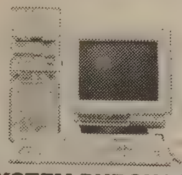

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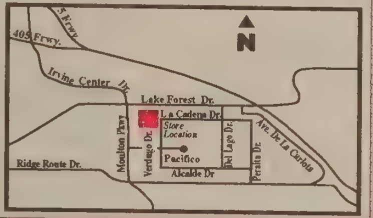

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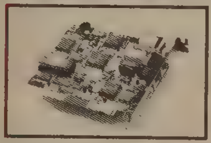

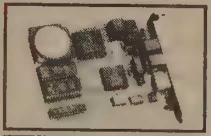

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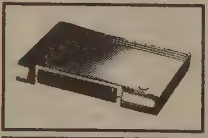

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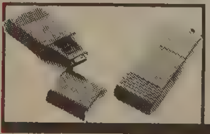

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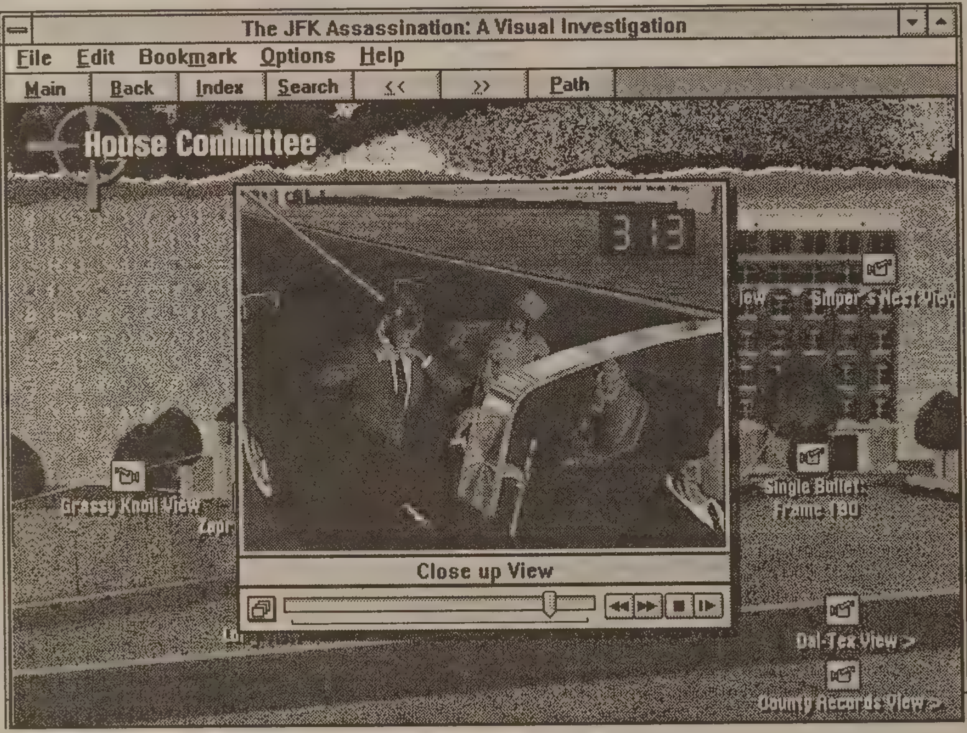
per-second rate is borderline. In addition, the size of the picture is so small that it's like looking through the wrong end of a telescope.

None of this is Medio's fault—it's simply the state of what's generally available on consumer-level machines. I'm picky about image quality; there's a generation accustomed to playing what I consider graphically awful video games who don't seem to mind that kind of picture quality, but right now MPC video is not ready for prime time.

Of course, this will change—perhaps even by the time you read this. The pace of progress is fast and furious and raising the quality of video playback is clearly the number one economic and technical problem that must be solved to make multimedia titles really attractive to consumers.

The other event that occurs during this initial setup is what is euphemistically referred to as "a chance to view demos of other Medio products." While I appreciate the need to explore every marketing angle possible, and while in some ways this might be considered as no more than the equivalent of trailers for coming attractions before a movie or a list of an author's other works at the beginning of a book, I found it crass and irritating. To be fair, it was only about fifteen seconds of audio and a dialog box—and it only happens during initial setup and not on subsequent uses of the product—but it is too obtrusive and does not set the right tone.



Medio's J. F. K. Assassination—A Visual Investigation is a fair example of the potential benefits of multimedia, and also illustrates some of the inherent difficulties and a few relatively minor design problems.

J. F. K. ASSASSINATION

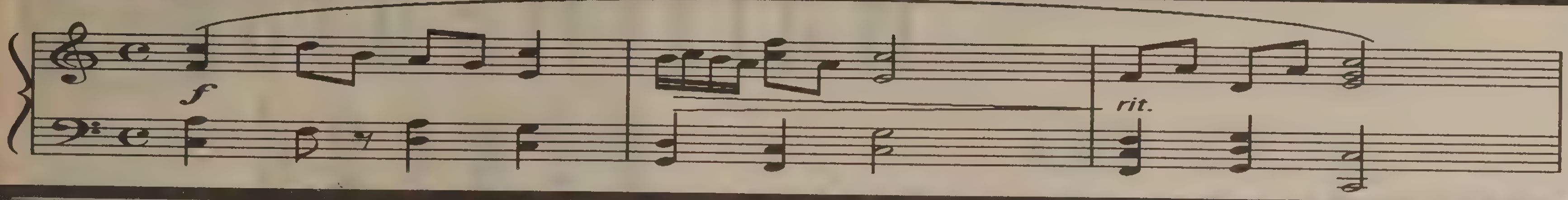
The Kennedy assassination is possibly the most exhaustively analyzed event in American history. Do we really need a multimedia title to add to the flood of material about that moment of history? Perhaps we don't actually need one, but Medio's J. F. K. Assassination—A Visual Investigation is a fair example of the potential benefits of multimedia, and also illustrates some of the inherent difficulties and a few relatively minor design problems.

On the plus side, the CD-ROM contains multiple digital media: video, including the Zapruder film and three other amateur movies of the motorcade; a large number of news photos; 3-D, computer-animated models showing various possible bullet trajectories depending on the assassination theory of your choice; maps and diagrams that allow you to take different positions around Dealey Plaza; audio voice-overs for newsreel footage and reading some stills captions; the entire text of three books—Jim Marrs' *Crossfire* (the basis of Oliver Stone's movie), *The Warren Commission Report*, and *The Assassination of John F. Kennedy: A Book of Facts*, plus other textual material.

There are good index and text-searching capabilities; the cross-referencing is more than adequate; you can bookmark material you want to come back to; it's easy to retrace your steps with the Path function or by clicking on the Back button; and in general it's pretty easy to find your way around. You have control of the relevant and important movies and animations with freeze frame, single frame advance, fast forward, and rewind, along with close-ups of significant details in the Zapruder film.

It's a lot of material—frankly far more than I could absorb to make any in-depth comment on the quality of its content—but its tone is sober and scholarly. The announced purpose of the title is to allow users to draw their own conclusions. I detected no editorial bias toward any particular point of view; certainly the sources of the content are widely varied.

The navigational design is a well-organized, multilayered, branching structure. At the top level, you have a choice of going to any area at the next level, each of which basically contains one media type: Intro, Overview, Dealey Plaza, Films & Photos, Analysis, or Text. Depending on the amount of information in an area, you may have several more choices before you get to any content. If you choose Intro, you go straight to a narrated series of newsclips, but if you choose Films & Photos, you then have a choice of four movies or the Photo Library. If you choose the Photo Library, you have another choice of what



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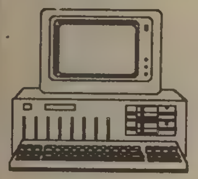

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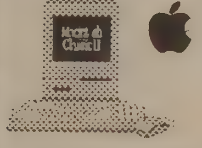

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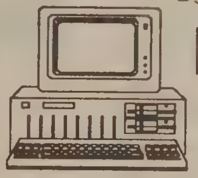

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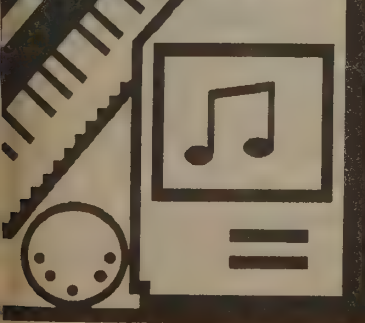

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category of photos you wish to see: JFK, Dealey Plaza, Oswald, Funeral, Evidence, or Principals.

Each of these categories is in fact consecutive with the others. Once you're in the Photo Library, you can page through all the photos without having to go back up a level to get into the next category, which means that if you wish to skip a category—the autopsy photos are gruesome and gory, maybe you'd rather not look at them today—you have to go back up and reenter the Library through another category. This would be easier to do if you knew that you were looking at the last photo of a category through the use of a # of # scheme. However, ultimately it's a trade-off, since it can be equally frustrating to have to go back up a level and down again, which is what you have to do to get to the next movie.

An added irritant in this title's case is that there is no on-screen button to take you back up one single level. There's a button on the sub-menu bar that will take you back to the top-level original choices, or you can use the Back button to page back one page at a time, or you can pull down the Path menu and select the last time you were on the next higher level. If you've gone through a lot of pages, that can mean a lot of scrolling. If you entered the section through the index or some other lateral path that higher level will not show up on your Path.

Raising the quality of video playback is clearly the number one economic and technical problem that must be solved to make multimedia titles really attractive to consumers.

One of the biggest tricks in interface and navigational design is minimizing mouse movement and the number of clicks needed to get you from one place to another: I believe that in this sort of structure a single click to raise you a level or take you to the next item on the same level is generally worth a little screen clutter.

It's a testament to the overall quality of J. F. K. Assassination that this was the most annoying problem I came across. The video quality has the same drawbacks discussed earlier, but the original quality of the footage is mostly not very good anyway. The still photos are of good quality. The sound occasionally breaks up, and I could not discern why some captions were read faithfully, some read only approximately and some not at all.

I found one button that was supposed to play a movie, but instead took me to the next movie. The palette management causes some flashing between different sections. These are generally minor details that do not significantly affect the utility of the title.

A problem that does affect that utility is the color-coding scheme in the Analysis section to show the differences between the various theories of the number of shots fired. Something just does not communicate here, which is particularly unfortunate since it has the potential to be a valuable explanation of what might have happened. A solution to this problem might be for there to be a

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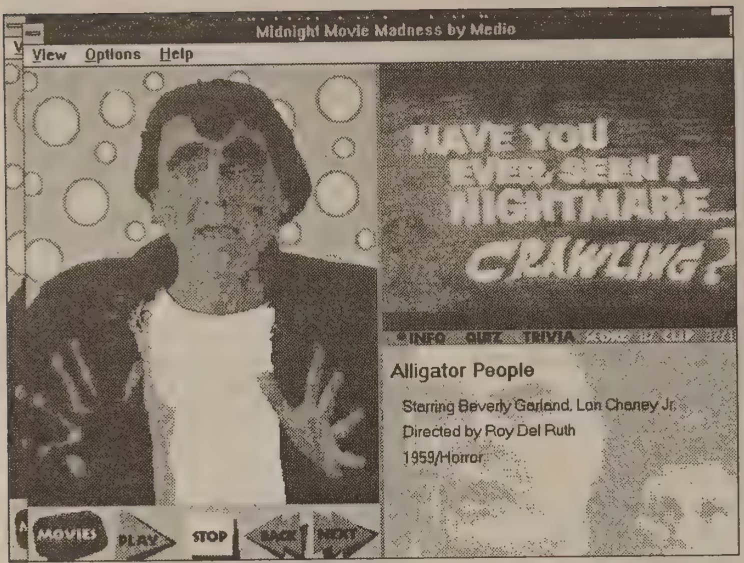

Midnight Movie Madness by Medio

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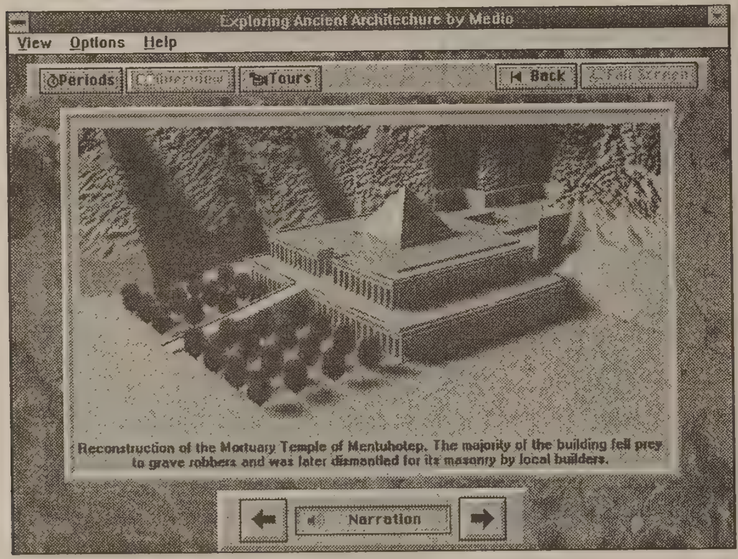
Directed by Roy Del Ruth

1959/Horror



Exploring Ancient Architechure by Medio

Reconstruction of the Mortuary Temple of Mentuhotep. The majority of the building fell prey to grave robbers and was later dismantled for its masonry by local builders.

printed (on paper!) explanation of the graphics for simultaneous reference—anathema to some multimedia CD-ROM designers, but if the medium does the job, use it!

MIDNIGHT MOVIE MADNESS

The content of Midnight Movie Madness is basically thoroughly silly—but at least it's sometimes fun to play with. Gilbert Gottfried as the fake Geraldo is obnoxious, but hit the space bar and you're rid of him!

The Spirit of the Drive-In has an irritating but in-character voice. The sound is a little garbled and much of what he says isn't worth hearing anyway—but some of what he says really does hit the spot and I found myself clicking again and again just to get one of my favorite randomly selected phrases. Clicking on his hands causes short musical selections to play, again randomly selected. Rapidly repeated clicking can produce some interesting sounds. It's fun to click on the movie screen and get one of twenty clips that may have played in an actual vintage drive-in theater.

The quiz is pretty weak. Part of the humor is supposedly that the third choice is funny—well, maybe it is to barely pubescent boys, but a lot of it is just stupid or offensive. The delivery is erratic. Occasionally the third choice is actually the right answer—but so what? Once you've figured out the right answer, you can boost your score by clicking on it again and again, steadily increasing your percentage score. It would be an improvement to be able to reset the score to zero without exiting the title and for two or more players to be able to compete (assuming that two people would want to do such an inane thing).

A few other improvements would be putting the movies in random order instead of the constant order you get when there are no categories of decade, director, or what-have-you selected; putting the name of the movie on the screen if you're in the quiz or trivia mode; and extending the selection area to where the indicator appears instead of only covering the type area. These are small details that would have added a little polish to a product that is basically an idiotic toy—but they're also details that might improve other products.

EXPLORING ANCIENT ARCHITECTURE

Medio's final title, Exploring Ancient Architecture, has a lot of potential but falls short on delivery. You have a choice of four periods: Neolithic, Egyptian, Greek, and Roman. Each has an overview, which is basically a narrated slide show, and also a tour of two buildings from the period (one in the case of the Neolithic).

The building tours using 3-D models are the real focus of the product. You can navigate your way around them using buttons to turn or go forward and can repeat your last movement with a slider bar under the video window. Your position in the building is shown on a plan by a red dot.

One problem is the general quality of the video: it's either too small or it's too grainy to really appreciate what you're seeing. However, a much bigger problem is that the navigational system produces an incredibly strange and dislocated sense of place—sometimes the buttons take you around right angles, sometimes you simply turn, sometimes you turn and move, sometimes your gaze tilts and rotates overhead. The red dot on the plan does not move with you synchronously but jumps to the next spot when the movement is completed. It has no pointer to indicate the direction you're facing. Due to the brightness of the dot, what you really want to do is drag it around to control your movement. Adding to the dislocation is the fact that sometimes you're accompanied by music or a narration explaining what you're supposed to be seeing and sometimes you're in sepulchral silence. Many of the sound clips come in with an unpleasant pop.

Basically this is a project with content that would have made a more satisfying linear TV documentary at this stage of its development. The idea is good but the execution is of rough demo quality. If it had even only a simple text glossary of architectural terms and a time line along with a navigational system akin to Myst's, it would be considerably improved as a multimedia product.

ACCESS

Medio Multimedia can be reached at 2703 152nd Ave., N. E., Redmond, WA 98052; phone, (206)867-5500. These titles require a 386SX or higher processor, 2MB of hard disk space, a VGA or better display (256-color support is recommended), Windows 3.1 or later, and DOS 3.1 or later. An audio board with speakers or headphones is also recommended along with a mouse or other compatible pointing device. The recommended retail price for each title is $59.95; all three are available as a bundle, The Explorer Collection, for $119. ■

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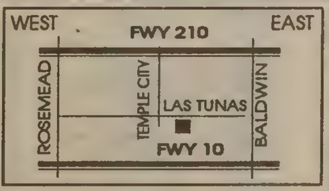

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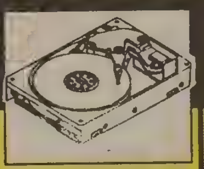

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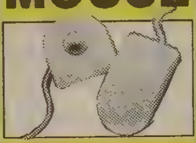

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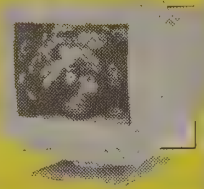

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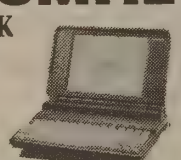

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Amigas And PCs:

A Comparative Look

If You Want To Work In Multimedia, "Nonstandard" Might Be Better . . .

BY DOUGLAS J. NAKAKIHARA

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Following last month's look at NewTek's Video Toaster, it seems appropriate to spend some time on the computer that makes it all possible: the Commodore Amiga.

To provide a frame of reference, I'm going to compare it to an IBM compatible running Microsoft Windows 3.1, which I'll generically refer to as a "PC."

THE PC'S SUCCESS

Why is the PC so successful? On the surface, the obvious answer is price. However, it goes much deeper than that.

The PC platform provides an open architecture, while the Amiga has always been very closed. Although IBM has totally lost control of the architecture it created, competition between the many rival IBM clone makers has rapidly driven technology higher and prices lower. Commodore, on the other hand, has sole control over its platform, but the Amiga's installed base has not prospered the way the PC's has. (Apple is finding a similar result with the Macintosh.)

Another thing propelling the PC is comfort level. Buying a computer can be a harrowing experience these days. There are just too many choices even if you know which platform you want, and it's so easy to buy the same computer you use at work, or the same one your friend has. Technical support is also more readily available.

In general, the huge PC market means more software and hardware development, greater availability of product, and cheaper prices. This has a downside—because no single entity is controlling the PC architecture, there's a myriad of incompatible standards. Much of this is due to hardware developers trying to get around the limitations of the architecture, all believing their way is best. The confusion is about to increase ten fold as Microsoft begins to port Windows NT to non-Intel-based PCs.

SIMILAR FACE, DIFFERENT EXPRESSION

Both platforms use a graphical user interface. However, operationally, about the only thing that Windows' Program Manager and the Amiga's Workbench share is icons.

A major difference between the two is that with Windows, icons have no relationship to the file directory structure. With the Amiga, icons represent actual disks, files, or directories. Thus, if you are already familiar with directory and subdirectory hierarchy, the Workbench is very intuitive. You can graphically perform file management right on the Workbench. Delete an icon in Windows and the underlying file remains intact. Delete an icon on the Workbench and the underlying file is deleted. Windows relies on another program, the File Manager, for any procedure involving file structure.

> If you must specifically run Excel, Word, Lotus, etc., you have no choice but to get a PC. However, if you only need spreadsheet and word processing capabilities, the Amiga may be a worthwhile solution.

The Amiga enjoys a very fluid operating system; Windows, in spite of all its power, is anything but fluid. In AmigaDOS you can switch between tasks and never encounter any pausing for disk access. Multiple programs run simultaneously with minimal impact on each other. In the event that a program crashes it rarely brings down the entire system. Amazingly, the operating system requires only 512K of RAM—one-half meg—and boots in a matter of seconds. Moreover, most Amiga expansion cards automatically configure themselves so you don't have to worry about interrupt conflicts—it's plug and play. The Amiga's thirty-character filename limit is also an advantage.

PREEMPTIVE MULTITASHING

The Amiga uses preemptive multitasking, as do Windows NT and OS/2, while Windows 3.1 relies on cooperative multitasking. The advantage of preemptive multitasking is that the operating system

continued on page 154

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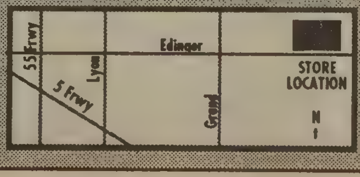

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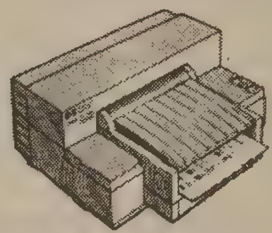

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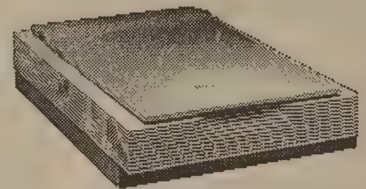

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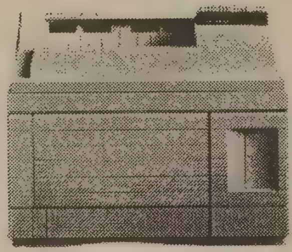

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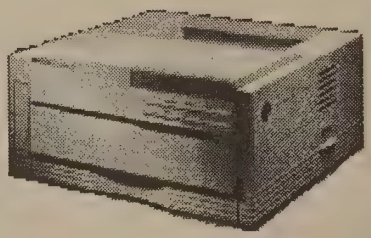

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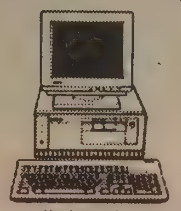

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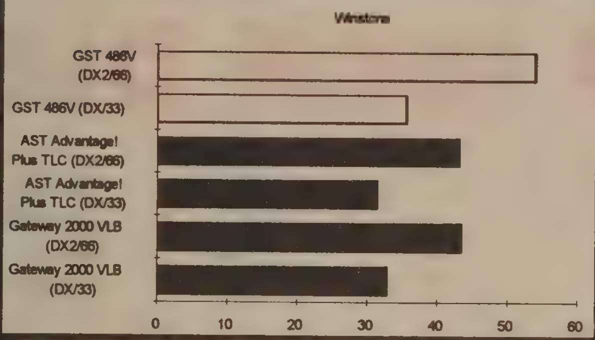

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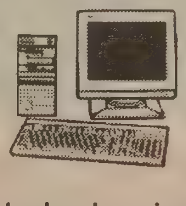

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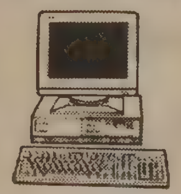

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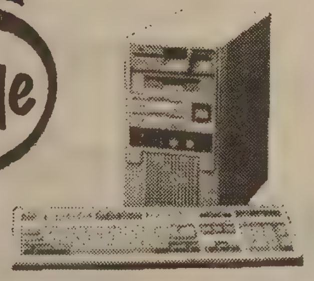

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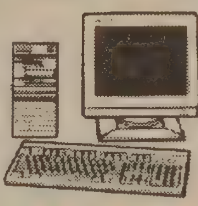

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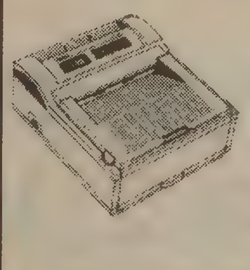

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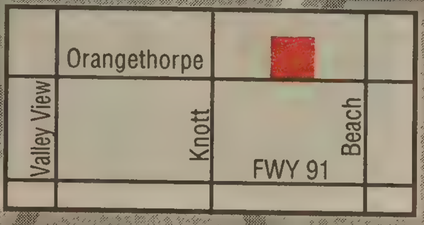

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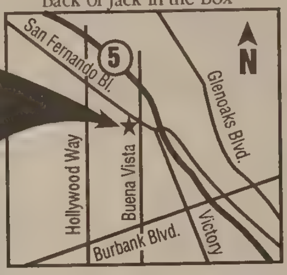

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continued from page 148

dynamically determines which applications get to run. With cooperative multitasking, the applications run the show. CPU time is more efficiently allocated with preemptive multitasking, resulting in significantly better overall performance.

You're wondering why you need to multitask, aside from, perhaps, background printing. Well, let's say you're working on a report using a word processor. Since you always work better listening to some music, you're playing some songs you composed using the Amiga's four-channel audio. And, like all conscientious computer users you're also backing up your hard drive to a tape drive.

Suddenly you remember that your friend was supposed to email you some information for your report. You fire up your modem and log onto your BBS. Luckily your friend's message is there, so you capture it to a file. You also notice a few interesting public domain programs, so you start to download them. While downloading, you merge the captured text into your report and work on it a little more.

Finally, the first file is downloaded, but the second is not finished yet. Since the file is compressed, you decompress it using a utility program. Flipping to the backup program screen, you note that it's only half completed. After reading the decompressed documentation file you are sure your neighbor would love to see it. Of course you have no empty formatted disks, so you place a blank disk into your floppy drive and format it. A quick check of the download shows that it's done, so you log off the BBS. By this time the floppy is complete so you copy the relevant files over.

You might find this example farfetched, but I do this kind of thing all of the time. Once you get used to real multitasking, you'll find it a godsend. This example could not be done with Microsoft Windows 3.1.

Preemptive multitasking also allows a very powerful language called ARexx to really shine. On a very basic level, ARexx is similar to a macro, like the ones in Lotus 1-2-3. However, it goes far beyond that, allowing one program to control other programs to create a symphony of applications all dynamically interacting in concert with each other. This lets you combine presentation programs with audio, database, serial and infrared controlled peripherals, image processing, and video applications. Nearly every Amiga program worth its salt supports ARexx.

PRODUCTIVITY PROGRAMS

Most people, I'd guess, buy PCs to run two main types of programs: a word processor and a spreadsheet. If you are hoping for an Amiga version of Word, WordPerfect, Lotus 1-2-3, or Excel, you'll find that none of the major PC developers have ported their wares to the tiny Amiga market. However, you'll find Amiga word processors, spreadsheets, and desktop publishing programs that will satisfy 99% of the average computer user's needs. Additionally, Amiga

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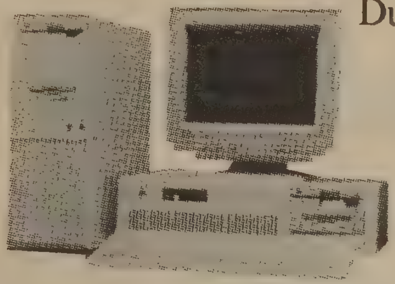

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software is generally cheaper than similar PC software.

The Amiga has hardware and software emulators for Mac and PC. However, I'm not convinced that they are cost- and performance-effective solutions, considering how inexpensive the real McCoys have become.

GRAPHICS AND VIDEO

Whatever the Amiga lacks in productivity titles, it more than makes up in graphics and video capabilities. However, the stock statement that "the Amiga was made to do video and is therefore better at it" is all but untrue today, due to add-on hardware now available for the PC. But because the Amiga, in its native state, supports video resolutions and interlacing, it's certainly easier and cheaper to use an Amiga for video.

With an inexpensive Amiga 1200 alone, you could easily create some spectacular animations to spice up your home videos. If you wanted to get tricky, your computer graphics could be placed over your video footage using a genlock. You can also do the opposite and place video over computer graphics weatherman-style using a special keying device.

Playback is also an important issue. Without expensive additional add-on hardware, a PC cannot match the animation capabilities of the Amiga. Most PC animations only use 256 colors, where the Amiga can animate using a thousand times that!

Of course I have to mention the Video Toaster. Nothing else on any platform can match all of this video wonder's capabilities. Broadcast-quality video editing, character generation, 3-D animation, etc.—the Toaster does it all! (See last month's issue for more details.)

ENTERTAINMENT

Entertainment titles are grabbing more and more of the PC software market. However, fast-paced Nintendo-style games are generally not available on the PC. The hardware is not up to the task—it wasn't designed to do it. You don't see anyone trying to repackage an IBM compatible into a game console like Commodore is doing with CD32, the soon-to-be-released Amiga console; it would either be too slow or too expensive.

Great arcade-action games require fast graphics and great audio. The Amiga offers both and always has. The Amiga's problem here is the same as in the productivity area: The smaller Amiga market has fewer titles. However, many of the available games are superb.

MULTIMEDIA

Is it really such a big deal that you can show a jerky miniature "movie" on a computer screen? Why not just buy a laserdisc player? State-of-the-art PC multimedia would be laughed at, if broadcast on TV.

If you really want to do live or taped presentations that combine "multiple media" like animations, graphics, sound, laserdiscs, etc., the Amiga is hard to beat. In my opinion it surpasses what's available in the PC market for three reasons: 1) graphics performance; 2) multitasking capabilities; and 3) price. For around $1000, you could have a very powerful presentation system based around an Amiga 1200.

AMIGA MODELS

There are currently only two Amiga computers in production: the Amiga 4000 and 1200. The Amiga 4000 is available with either a 25MHz Motorola 68040 or 68030 CPU. This desktop computer has expansion slots and comes with a 120MB hard drive. Memory is limited to 18MB on the motherboard, but can be expanded via expansion cards. Resolutions up to 1280 x 480 as well as 800 x 600 are available with 256,000 colors. Four channel 8-bit audio is built in; 24-bit color boards and 16-bit audio cards can also be added via expansion slots. The 1200 is a slotless version that uses a 14MHz 68020.

One word about the audio. Although its sound is only 8-bit, the Amiga supports direct to disk wave form sampling and playback. Many IBM-compatible sound cards are limited to synthesized sound reproduction and thus cannot play real-world sounds. (As a testament to the high quality of the Amiga's audio, a song I'd composed using only the Amiga's built-in audio was played on KPWR Power 106 in Los Angeles. I'm sure they thought I used a lot of expensive equipment.)

THE FUTURE

On the PC software side, Microsoft is addressing many of Windows' deficiencies in the next release. However, it remains to be seen how well the new version deals with such issues as real-world hardware requirements and backward compatibililty. On the PC hardware front, the only thing you can count on is that the tide of the confusing sea of standards will continue to rise. For the Amiga, the next generation hardware is just around the corner, with significantly enhanced graphics and audio performance.

CONCLUSIONS

There is no way to discuss all of the differences between the two platforms. However, I've tried to highlight the major functional differences that really matter to the user. I should note that the two platforms do share many of the same peripherals like printers, hard drives, modems, etc.

The bottom line is that you need to define your needs. If you must specifically run Excel, Word, Lotus, etc., you have no choice but to get a PC. However, if you only need, for example, spreadsheet and word processing capabilities, the Amiga may be a worthwhile solution, especially if you also are interested in affordable high-performance graphics and video applications. It will take a little more work, but try to check out what the Amiga has to offer, especially if you are looking for a second computer. Incidentally, if you start asking around about Amigas, make sure the person you talk with really knows Amigas. I have heard many "computer" salespersons spout off ignorant half-truths about the Amiga. ■

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Multi & Media beyond

"3-D FlyThroughs with Virtus VR"

BY TONY REVEAUX

Virtus VR is a $99-list 3-D modeling program for Macintosh (and, soon, Windows) that combines a very high level of performance with an easy entry and an affordable price.

It was written to leverage off the processing power of Motorola 68040-based Macs, and requires at least 4MB of RAM. I've been running it on a Macintosh Centris 650 with 8MB, and sometimes it seems as swift as a Sun workstation.

Virtus VR will be functional on 68030 Macs, and can work well on a color PowerBook, but you will have to be less ambitious and more patient. Occasional crashes should not be unexpected, and there may be Sound Manager conflicts encountered on the Mac AV series. The PowerPC beta version is reported to be a real screamer.

DESKTOP VR

Virtus calls the new product a "virtual reality" (VR) program. This is stretching things a bit, but—of the six or seven levels of VR—it certainly qualifies as a dynamite example of VR level #1, which is "desktop" or "window" VR.

What you see on your monitor is what you get, and you get a lot with Virtus VR. It allows you to invent, explore, and alter realistic 3-D worlds. You can fly around and through full-color planes, solids, objects, and environments that you can erect in minutes. You can apply this system to creating models and simulations for anything that is founded on three-dimensional massing as experienced through time. Home remodeling, commercial space planning, scenic design, scientific representation, legal reenactments, and recreational creativity are just some of the uses it can be put to.

The package comes with a video that shows what Virtus VR can do, and examples of how to do it. The Quick Reference card assembles into a desktop cube, appropriate for this title. The program comes with several fully assembled color 3-D sample scenes, including The White House, a regular house, the Hindenberg, and an undersea complex on the ocean floor. For

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those of you who want to make an eagle's-eye investigation of Dallas's Dealey Plaza, scene of the JFK assassination, this one is complete with Kennedy's open Lincoln and the fateful window picked out on the façade of the Book Repository. Plus (and I'm not making this up), there's also one of the Branch Davidian Compound including (at no extra cost) an armored assault vehicle.

UP AND RUNNING WITH VIRTUS VR

Virtus VR is an accelerated, aerobicized "lite" version of Virtus Walkthrough ($195), with some of the features of Virtus Walkthrough Pro ($395). With more optimized algorithms, Virtus VR runs about 30% faster than those more professional programs. Of course, you can always build more and run faster if you shift your desktop from color to black-and-white, and return to color for your final screens. But the system of the Macintosh that is hosting the program must include Color QuickDraw.

In the cause of speed and simplicity, Virtus VR is shorn of a lot of the creation tools and other measuring and codifying capabilities of the "heavy" programs. You can't create and save custom libraries of objects and attributes. Instead, you are dependent upon the Galleries of objects. It includes libraries such as basic and advanced shapes, landscape, farm, home, office, people, military, and space. Additional Galleries are being added, such as the Home Design and Science Fiction package for $29.95.

Using the Galleries couldn't be simpler. Instead of drawing a shape and extruding it, you just drag-and-drop the object from the Galleries Window into the Design Window. There, you can resize it and reorient it from here to next Wednesday.

If you want to modify the object, first you need to ungroup it. Then you can have a purple cow or a brick cadenza. Not only that, but you can scavenge the objects for construction elements. Those legs from the kitchen table are readymade lumber, and there are all kinds of neat shapes that you can score when you perform your own swords-into-plowshares conversions from the tanks and planes in the military galleries.

The shapes in the well-stocked galleries have enough variety that you can construct most of the designs that you would need. The 2-D Galleries supply many opaque and translucent shapes, including doors and windows, that you can apply to surfaces of 3-D objects.

They can prove to be tricky, though. When you drop them in the design window in a space by themselves, they can be hard to kill. You have to delete the 3-D object that the 2-D shape is bonded to, even if they are a mile away from each other.

Part of Virtus VR's modeling sophistication comes from its design containment, auto connection, and collision avoidance features. Design containment is a form of bonding or parenting between elements

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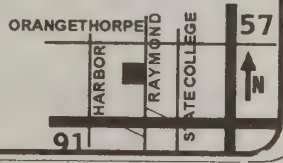

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that allows them to move together and resize together. This includes objects within objects.

Auto connection is like electronic crazy glue; when you place two objects against each other, they will share the same surface attributes.

Collision avoidance is a feature that you can turn on and off from the Preferences menu. When it is on, and you are traveling through a 3-D shape like a building, you'll have to find the open doors, because you can't go through walls, floors or ceilings; a "bump" sound will reinforce that limit. When it is off, you can coast through the walls like Casper the Ghost. This can be very useful, if somewhat disorienting. It's the only way you can explore the vast interior of the Hindenberg's gas bag, for instance, and it allows you to swoop through The White House with the ease of the FBI.

Another advantage Virtus VR has over Walkthrough is the ability to add textures. Like Virtus Walkthrough Pro, its Walk Window has a higher resolution renderer, allowing the clarification of smaller details and finer pixel elements; it also gives you higher quality hard-copy printouts.

Adding a texture to a surface face, or over the entirety of a grouped or auto-connected object, is as easy as changing the color selection from the color picker window. A library of textures is included in the program. They include some very realistic brick, sky, and turf. More good news is that you can add any PICT file to that library by simply dropping that PICT into the Textures folder in the program folder; it will then appear under the Custom submenu. That means that you can draw from the great variety of graphic clip art packages out there, and the libraries of color textures and backgrounds like the Wraptures CD-ROMs from Form and Function.

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The most impressive quality of Virtus VR is its walkthrough, or flythrough, motion control animation. Its detail, speed and flexibility approaches that of graphic workstations, or at least a megged-up Quadra. But it's all in the software. Even in the "slowest" mode under the Walk Menu, my Centris 650 pushes the display so fast that I often expand the Walk Window to full screen to help slow it down; otherwise I sometimes lose the object as it whizzes by.

Navigation is mouse-driven, either by moving the cursor in the Walk Window, or clicking on the Navigation Buttons below. There is no implementation of the arrow keys from the keyboard.

Coordination between the Design Window and the Walk Window will help you to see and find things. The Observer is a point of view (POV) reference in the Design Window that shows where the POV is in the Walk Window. Click and drag the Observer icon to wherever you want in relation to the objects in plan, front or right views, and the Walk Window POV will follow.

There is no collision detection active in the Design Window. You could drop the Observer into a closed area that had no entry, say the Roach Motel, and then examine the interior in the Walk Window. You may go in, but only the Observer can get you out!

Open one of the sample scenes, look under the Walk menu, select Play, and then sit back and watch. You will see enacted before you another strong feature of Virtus VR — its recordable motion mode. In these sample scenes, you're seeing recorded paths. You can create your own, in a sample scene or a model that you constructed yourself, by selecting Record. Recording a path and playing it back is taken care of within the program. You must have QuickTime in your system to save it out as a QuickTime MooV, where it can be used and repurposed independently.

You can also choose which window you want to record as a single frame Snapshot, and save as a PICT file.

Virtus VR is one of those programs that can be used just to show off a Mac '040, but most importantly, it brings solid model creation and animation within the skill-set and price range of anyone. ■

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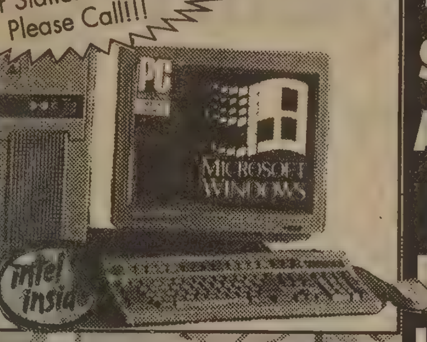

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VESA PCI/VLB 486DX-40MHz 256K Cache	548
VESA PCI/VLB 486DX-33MHz 256K Cache	558
VEGA EISA/VLB 486DX2-66MHz 128K Cache	698
VESA EISA/VLB 486DX2-50MHz 128K Cache	548
VEGA EISA/VLB 486DX-50MHz 128K Cache	678
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VESA LBus 486DX2-50MHz 128K Cache	398
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VESA LBus 486SX-25MHz 128K Cache	199
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IBM 486SLC2-66MHz VLB 64K Ext. w/Math Co.	327
IBM 486SLC2-66MHz ISA 64K Ext. w/Math Co.	249
IBM 486SLC-33MHz ISA w/CPU	118
Cyrix 486DLC-33MHz 128K Cache	147
Cyrix 486DLC-40MHz 128K Cache	167
Cyrix 486DLC-33MHz 128K C. w/Math Co.	187
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386SX-40MHz	89

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Item	Price
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DC99 IDE 16 Bit Cache Controller (Up to 8MB)	129
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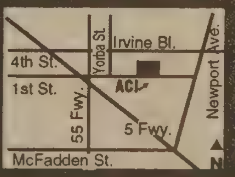

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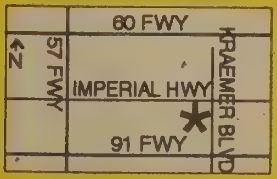

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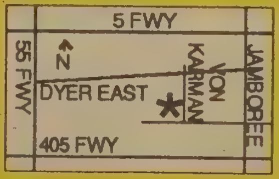

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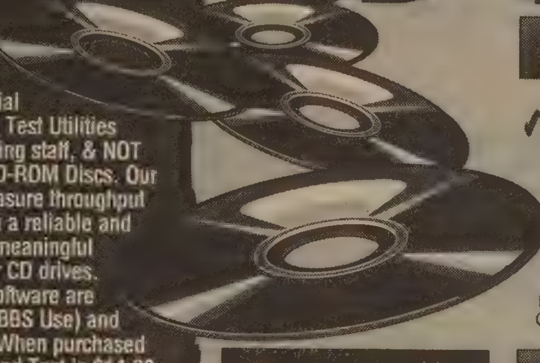

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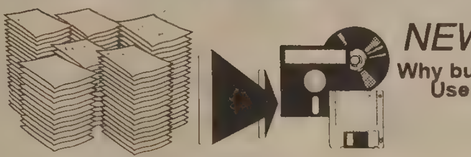

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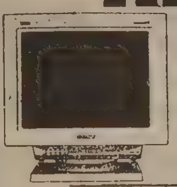

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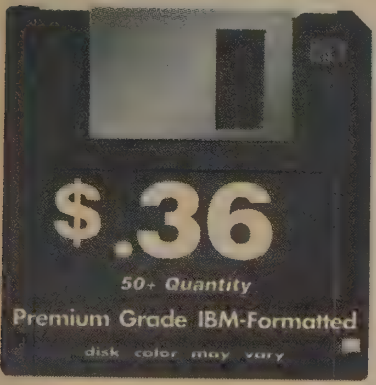

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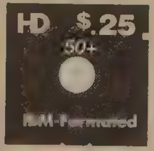

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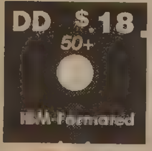

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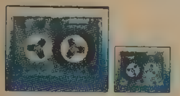

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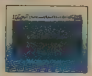

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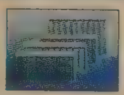

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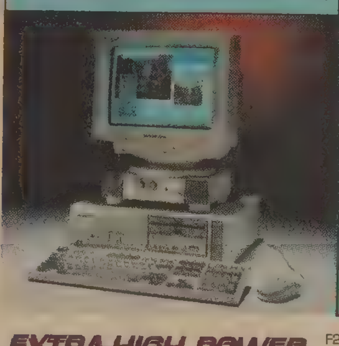

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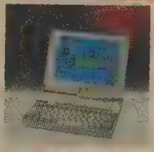

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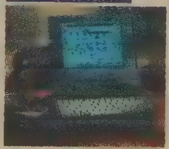

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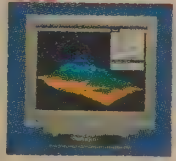

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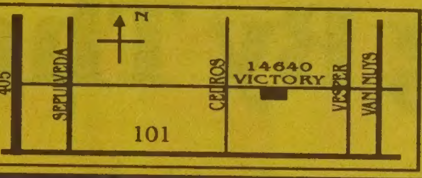

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or

A Convention Town, It Ain't

BY JOHN C. DVORAK

DVORAK'S LAST COLUMN

Can there be a worse town for having Macworld Expo than San Francisco? Nope, no way. January's Macworld showed once and for all that San Francisco is ill-equipped to have a convention or show if more than ten thousand people attend. I'm not even sure the town won't bust at the seams at ten thousand. Cut loose fifty or sixty thousand and all hell breaks loose.

Ever since the ridiculous expansion of Moscone center—which can now be called the worst show site in America—it's painfully obvious that City Hall is more interested in parking tickets than hospitality. Parking ticket revenue has become a profit center in San Francisco, and the mess around Moscone indicates to me that San Francisco doesn't care one iota about anything but parking ticket revenue. Either that or the city is run by boneheaded idiots.

GRIDLOCK: THE MESS CONTINUES

Let's look at the Macworld mess. Gridlock for ten square blocks around Moscone. The first thing the city does is ban parking at the metered parking spaces behind Moscone. Why? To help the flow of traffic? No, that can't be it, since a construction fence near the end of the street completely blocks the lane freed up by the parking ban. Is parking banned in these spots because there is construction going on? Nope, except for the fence, there is nothing going on. It's simply banned to lure suckers into parking there so they can get tickets. It also makes fewer legal parking spots available, forcing people to park illegally.

Example: The old US Mint building is surrounded by No Parking signs and people were forced to park there. All the alleys were filled with illegal parkers. The few pay lots were filled early, and at least two of them were hindered by some dubious street work that prevented them from maximal use. The Moscone parking lot was closed. The sign said Full, and even though people were leaving by droves there were no new people being allowed in. The large lot over by the Examiner building, which can normally have two entrances open, had one blocked off so that a line of cars went from Mission to the freeway exit. It was a joke. It took me one half hour to go one city block.

Historically, big shows used both Moscone and Brooks Hall/Civic Auditorium across town. This helped spread out the showgoers and the parking. You'd take the shuttle between one part of the event and the other.

This was not working for the city of San Francisco. They could not get enough people to park illegally with this situation. The best idea was to rip out the parking lots at Moscone (yes, there were parking lots) and double the capacity of the place. Since the roadways were not modified to handle the traffic, it would form a gridlock around the convention center. If there was a ten-story-high parking lot at Moscone it would take you hours to get to it. Everything surrounding the convention center is new enough that it won't get torn down anytime soon to improve this situation.

To make sure that the gridlock inconveniences the entire city (this is so the cretins in City Hall can have something to chuckle about at night) no police were enforcing the intersection blocking laws. In San Francisco you can't drive into an intersection on a green light if the intersection isn't clear—this causes gridlock. I drove around all the intersections surrounding Moscone and found no police writing tickets for these ongoing violations. Instead I saw meter maid trucks positioned at each intersection—poised to nail parking and meter violations. Priorities, priorities. Ask any Muni driver who had to drive through this mess for a confirmation of this observation.

BUT WAIT, THERE'S MORE

But that law, which desperately needed enforcing during the Macworld fiasco, was only one of the many laws not being enforced. Have you ever heard of vagrancy and loitering laws? San Francisco has them, but chooses to selectively ignore them, so the Convention Center is surrounded by beggars.

It's incredible that the City would let this out-of-control situation prevail at a national show like Macworld. I can't tell you how many people from places like New York and Chicago and Cleveland tell me how much worse the vagrant problem is in San Francisco than it is anywhere else in the country. Self-proclaimed homeless aggressively demand money from you on almost every corner of every street. They surrounded Moscone. Of course a few blocks away it's even worse.

A lot of showgoers were forced to park in the worst part of town. Let's call it 6th and Howard. It's amazing how San Francisco can put a showpiece like Moscone right in the middle of the worst part of town, but they did.

Anyway, I see two out-of-town yuppies (late 30s is my guess) standing on the corner of 6th and Howard. Obviously they parked off in the crummy part of town (which, as we know, is substantial). They are being followed by some poor raggedy-clad soul, his hand outstretched, a tattered coat sleeve dangling in the breeze. Across the street three or four others see this shrink-wrap couple and move in on them. The twosome are walking towards Moscone and in their path are five more beggars, one holding a cup, another a grimy Giants cap, the others standing and waiting their turn.

The couple look around. Anguish and fright cover their faces as these people move in. I swear it looked like a scene from the *Night of the Living Dead*. I couldn't help but laugh as he held her close as they looked all around for some escape route. "Welcome to San Francisco!"

I'm sure the city fathers (and mothers) will laugh over this kind of event, which must have been repeated hundreds of times over the course of the show.

The fact is this town is the worst for any such conference. Putting up tents in Candlestick Park would make for a better event. And I don't want to hear any nonsense about public transportation. The buses were not getting through this mess. Taking a cab was hopeless. If you weren't staying at the Marriott or the ANA you'd have to walk a long way from a cab dropoff point to get to Moscone.

It's a joke. Anyone putting on any kind of show would be ill-advised to use these facilities. It's almost easier for people from the Bay Area to *fly* to Las Vegas and go to the convention center there than it is to get to Moscone. Incredible, but true.

Please, oh please don't do the Macworld Expo in San Francisco again! ■

Copyright © 1994 by John C. Dvorak. All rights reserved. John C. Dvorak graduated from the University of California. He is a contributing editor of PC Magazine *and* MacUser, *and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.*

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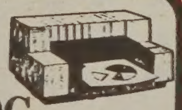

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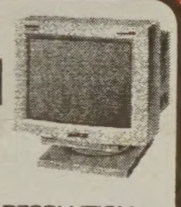

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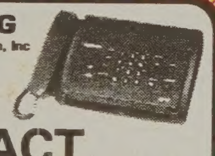

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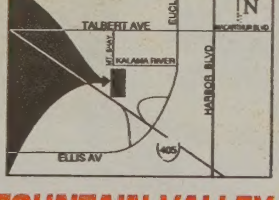

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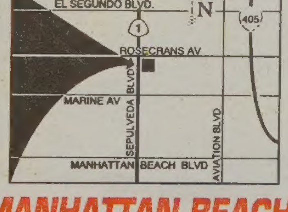

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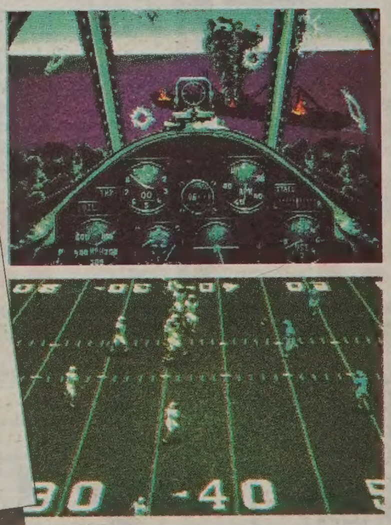

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